FCC Test Report

Report No.: AGC15942230802FR02

FCC ID	:	2A94QNB-HE002
APPLICATION PURPOSE	:	Original Equipment
PRODUCT DESIGNATION	:	Smart Space Heater
BRAND NAME	:	N/A
MODEL NAME	:	NB-HE002
APPLICANT	:	Shenzhen Aspiron Technology Company Limited
DATE OF ISSUE	:	Sep. 19, 2023
STANDARD(S)	:	FCC Part 15 Subpart C §15.247
REPORT VERSION	:	V1.0

*A*ttestation of *G*lobal *C*ompliance (Shenzhen) Co., Ltd

Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Sep. 19, 2023	Valid	Initial Release

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1. General Information

Applicant	Shenzhen Aspiron Technology Company Limited
Address	3rd Floor, Yiben Building, No.1063 Chaguang Road, Xili Street, Nanshan District, Shenzhen, Guangdong, China
Manufacturer	Shenzhen Aspiron Technology Company Limited
Address	3rd Floor, Yiben Building, No.1063 Chaguang Road, Xili Street, Nanshan District, Shenzhen, Guangdong, China
Factory	Shenzhen Aspiron Technology Company Limited
Address	3rd Floor, Yiben Building, No.1063 Chaguang Road, Xili Street, Nanshan District, Shenzhen, Guangdong, China
Product Designation	Smart Space Heater
Brand Name	N/A
Test Model	NB-HE002
Series Model(s)	N/A
Difference Description	N/A
Date of receipt of test item	Aug. 16, 2023
Date of Test	Aug. 16, 2023 to Sep. 19, 2023
Deviation from Standard	No any deviation from the test method
Condition of Test Sample	Normal
Test Result	Pass
Test Report Form No	AGCER-FCC-2.4GWLAN-V1

Note: The test results of this report relate only to the tested sample identified in this report.

Prepared By	Alan Duan (Project Engineer)	Sep. 19, 2023
Reviewed By	Calvin Liu (Reviewer)	Sep. 19, 2023
Approved By	Max Zhang Authorized Officer	Sep. 19, 2023

2. Product Information

2.1 Product Technical Description

Equipment Type	WLAN 2.4G
Frequency Band	2400MHz ~ 2483.5MHz
Operation Frequency	2412MHz ~ 2462MHz
Output Power (Average)	IEEE 802.11b:12.65dBm; IEEE 802.11g:10.32dBm; IEEE 802.11n(HT20):10.41dBm;
Output Power (Peak)	IEEE 802.11b:15.07dBm; IEEE 802.11g:17.64dBm; IEEE 802.11n(HT20):17.75dBm;
Modulation	802.11b:(DQPSK, DBPSK, CCK) DSSS 802.11g/n:(64-QAM,16-QAM, QPSK, BPSK) OFDM
Data Rate	802.11b:1/2/5.5/11Mbps 802.11g: 6/9/12/18/24/36/48/54Mbps 802.11n: up to 300Mbps
Number of channels	11
Hardware Version	V1.0
Software Version	V1.0
Antenna Designation	PCB Antenna
Antenna Gain	3.57dBi
Power Supply	AC 120V

2.2 Table of Carrier Frequency

For 2412-2462MHz:

11 channels are provided for 802.11b/g/n(HT20):

Channel	Frequency	Channel	Frequency	Channel	Frequency
01	2412 MHz	02	2417 MHz	03	2422 MHz
04	2427 MHz	05	2432 MHz	06	2437 MHz
07	2442 MHz	08	2447 MHz	09	2452 MHz
10	2457 MHz	11	2462 MHz		

2.3 IEEE 802.11n Modulation Scheme

MCS Index	Nss	Modulation	R	N_{BPSC}	N_{CBPS}		N_{DBPS}		Data Rate(Mbps)	
									800nsGI	
					20MHz	40MHz	20MHz	40MHz	20MHz	40MHz
0	1	BPSK	1/2	1	52	108	26	54	6.5	13.5
1	1	QPSK	1/2	2	104	216	52	108	13.0	27.0
2	1	QPSK	3/4	2	104	216	78	162	19.5	40.5
3	1	16-QAM	1/2	4	208	432	104	216	26.0	54.0
4	1	16-QAM	3/4	4	208	432	156	324	39.0	81.0
5	1	64-QAM	2/3	6	312	648	208	432	52.0	108.0
6	1	64-QAM	3/4	6	312	648	234	489	58.5	121.5
7	1	64-QAM	5/6	6	312	648	260	540	65.0	135.0

Symbol	Explanation
NSS	Number of spatial streams
R	Code rate
NBPSC	Number of coded bits per single carrier
NCBPS	Number of coded bits per symbol
NDBPS	Number of data bits per symbol
GI	Guard interval

2.4 Related Submittal(S) / Grant (S)

This submittal(s) (test report) is intended for FCC ID: **2A94QNB-HE002,** filing to comply with Part 2, Part 15 of the Federal Communication Commission rules.

2.5 Test Methodology

The tests were performed according to following standards:

No.	Identity	Document Title
1	FCC 47 CFR Part 2	Frequency allocations and radio treaty matters; general rules and regulations
2	FCC 47 CFR Part 15	Radio Frequency Devices
3	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

2.6 Special Accessories

Refer to section 5.2.

2.7 Equipment Modifications

Not available for this EUT intended for grant.

2.8 Antenna Requirement

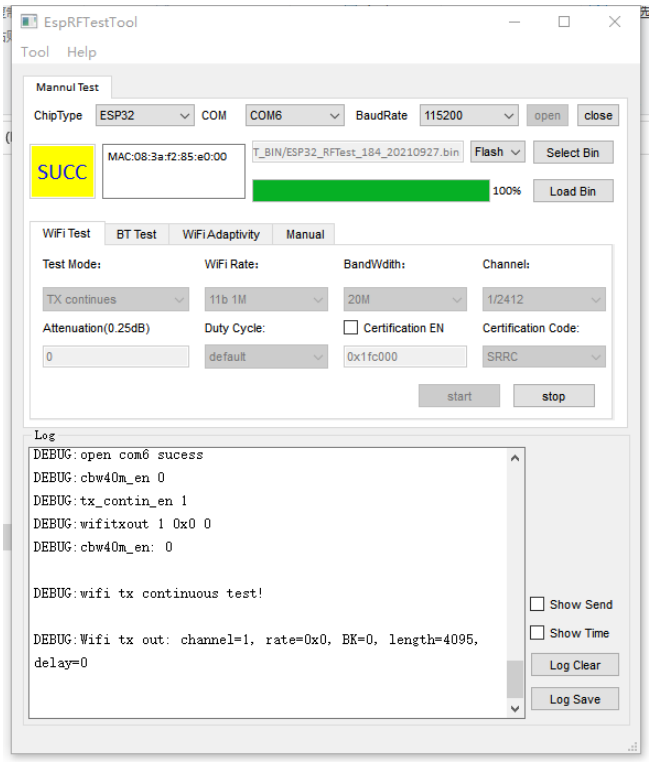
Standard Requirement
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. 15.247(b) (4) requirement: The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi
EUT Antenna:
The non-detachable antenna inside the device cannot be replaced by the user at will. The gain of the antenna is 3.57dBi.

2.9 Description of Test Software

For IEEE 802.11 mode:

The test utility software used during testing was “EspRFTestToo”, and the version was “V3.9.5”.

Software Setting Diagram



Test Mode	Channel	Power Index
		Chain 1
802.11b	L/M/H	0
802.11g	L/M/H	0
802.11n-HT20	L/M/H	0

3. Test Environment

3.1 Address of The Test Laboratory

Laboratory: Attestation of Global Compliance (Shenzhen) Co., Ltd.

Address: 1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

3.2 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L5488

Attestation of Global Compliance (Shenzhen) Co., Ltd. has been assessed and proved to follow CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories).

A2LA-Lab Cert. No.: 5054.02

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to follow ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

FCC-Registration No.: 975832

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files with Registration 975832.

IC-Registration No.: 24842 (CAB identifier: CN0063)

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the Certification and Engineering Bureau of Industry Canada. The acceptance letter from the IC is maintained in our files with Registration 24842.

3.3 Environmental Conditions

	NORMAL CONDITIONS
Temperature range (℃)	15 - 35
Relative humidity range	20 % - 75 %
Pressure range (kPa)	86 - 106

3.4 Measurement Uncertainty

The reported uncertainty of measurement y±U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

Item	Measurement Uncertainty
Uncertainty of Conducted Emission for AC Port	U_c = ±2.9 dB
Uncertainty of Radiated Emission below 1GHz	U_c = ±3.9 dB
Uncertainty of Radiated Emission above 1GHz	U_c = ±4.9 dB
Uncertainty of total RF power, conducted	U_c = ±0.8 dB
Uncertainty of RF power density, conducted	U_c = ±2.6 dB
Uncertainty of spurious emissions, conducted	U_c = ±2 %
Uncertainty of Occupied Channel Bandwidth	U_c = ±2 %

3.5 List of Equipment Used

● RF Conducted Test System							
Used	Equipment No.	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
☒	AGC-ER-E036	Spectrum Analyzer	Agilent	N9020A	MY49100060	2023-06-01	2024-05-31
☒	AGC-ER-E062	Power Sensor	Agilent	U2021XA	MY54110007	2023-03-03	2024-03-02
☒	AGC-ER-E063	Power Sensor	Agilent	U2021XA	MY54110009	2023-03-03	2024-03-02
☒	AGC-EM-A152	6dB Attenuator	Eeatsheep	LM-XX-6-5W	N/A	2023-06-09	2024-06-08
☐	AGC-ER-E083	Signal Generator	Agilent	E4421B	US39340815	2023-06-01	2024-05-31
☒	N/A	RF Connection Cable	N/A	1#	N/A	Each time	N/A
☒	N/A	RF Connection Cable	N/A	2#	N/A	Each time	N/A

● Radiated Spurious Emission							
Used	Equipment No.	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
☒	AGC-EM-E046	EMI Test Receiver	R&S	ESCI	10096	2023-02-18	2024-02-17
☒	AGC-EM-E116	EMI Test Receiver	R&S	ESCI	100034	2023-06-03	2024-06-02
☒	AGC-EM-E061	Spectrum Analyzer	Agilent	N9010A	MY53470504	2023-06-01	2024-05-31
☒	AGC-EM-E086	Loop Antenna	ZHINAN	ZN30900C	18051	2022-03-12	2024-03-11
☒	AGC-EM-E001	Wideband Antenna	SCHWARZBECK	VULB9168	D69250	2023-05-11	2025-05-10
☒	AGC-EM-E029	Broadband Ridged Horn Antenna	ETS	3117	00034609	2023-03-23	2024-03-22
☒	AGC-EM-E082	Horn Antenna	SCHWARZBECK	BBHA 9170	#768	2021-10-31	2023-10-30
☒	AGC-EM-E146	Pre-amplifier	ETS	3117-PA	00246148	2022-08-04	2024-08-03
☒	AGC-EM-A119	2.4G Filter	SongYi	N/A	N/A	2023-06-01	2024-05-31
☒	AGC-EM-A138	6dB Attenuator	Eeatsheep	LM-XX-6-5W	N/A	2023-06-09	2024-06-08
☐	AGC-EM-A139	6dB Attenuator	Eeatsheep	LM-XX-6-5W	N/A	2023-06-09	2024-06-08

● AC Power Line Conducted Emission							
Used	Equipment No.	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
☒	AGC-EM-E045	EMI Test Receiver	R&S	ESPI	101206	2023-06-03	2024-06-02
☒	AGC-EM-E023	AMN	R&S	100086	ESH2-Z5	2023-06-03	2024-06-02
☒	AGC-EM-A130	6dB Attenuator	Eeatsheep	LM-XX-6-5W	DC-6GZ	2023-06-09	2024-06-08

● Test Software					
Used	Equipment No.	Test Equipment	Manufacturer	Model No.	Version Information
☒	AGC-EM-S001	CE Test System	R&S	ES-K1	V1.71
☒	AGC-EM-S003	RE-Test System	FARA	EZ-EMC	VRA-03A
☒	AGC-ER-S012	BT/WIFI-Test System	Tonscend	JS1120-2	2.6
☒	AGC-EM-S011	RSE Test System	Tonscend	TS+-Ver2.1(JS36-RSE)	4.0.0.0

4. System Test Configuration

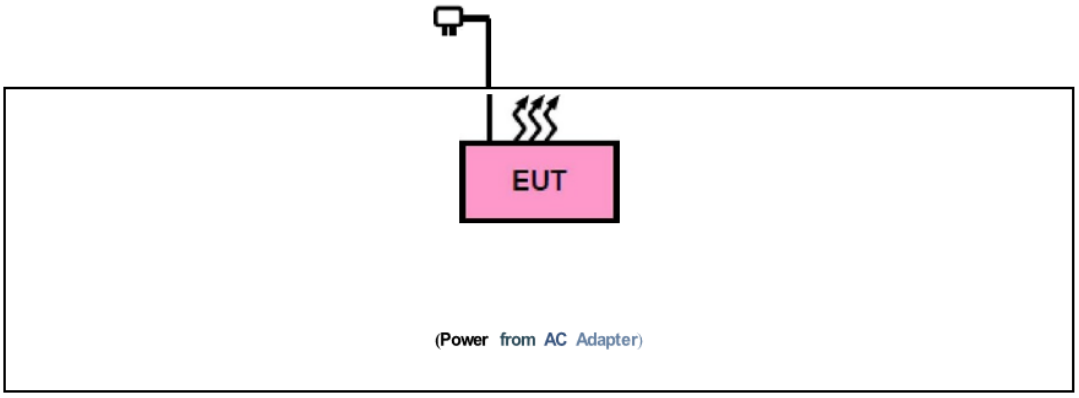
4.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

4.2 EUT Exercise

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

4.3 Configuration of Tested System



4.4 Equipment Used In Tested System

The following peripheral devices and interface cables were connected during the measurement:

☒ Test Accessories Come From The Laboratory

No.	Equipment	Model No.	Specification Information	Note
1	Control Box	USB-TTL	N/A	AE

☒ Test Accessories Come From The Manufacturer

No.	Equipment	Model No.	Specification Information	Note
1	Smart Space Heater	NB-HE002	2A94QNB-HE002	EUT

4.5 Summary of Test Results

Item	FCC Rules	Description of Test	Result
1	§15.203&15.247(b)(4)	Antenna Equipment	Pass
2	§15.247 (b)(1)	RF Output Power	Pass
3	§15.247 (a)(1)	6 dB Bandwidth	Pass
4	§15.247 (e)	Power Spectral Density	Pass
5	§15.247 (d)	Conducted Band Edge and Out-of-Band Emissions	Pass
6	§15.247 (d)&15.209	Radiated Spurious Emission	Pass
7	§15.207	AC Power Line Conducted Emission	Pass

5. Description of Test Modes

Summary table of Test Cases	
Test Item	Data Rate / Modulation
	2.4G WLAN – 802.11b/g/n (DSSS/OFDM)
Radiated & Conducted Test Cases	Mode 1: 802.11b_TX CH01_2412 MHz_1 Mbps Mode 2: 802.11b_TX CH06_2437 MHz_1 Mbps Mode 3: 802.11b_TX CH11_2462 MHz_1 Mbps Mode 4: 802.11g_TX CH01_2412 MHz_6 Mbps Mode 5: 802.11g_TX CH06_2437 MHz_6 Mbps Mode 6: 802.11g_TX CH11_2462 MHz_6 Mbps Mode 7: 802.11n-HT20_TX CH01_2412 MHz_MCS0 Mbps Mode 8: 802.11n-HT20_TX CH06_2437 MHz_ MCS0 Mbps Mode 9: 802.11n-HT20_TX CH11_2462 MHz_ MCS0 Mbps
AC Conducted Emission	Mode 1: 2.4G WLAN Link (AC power supply)
Note: The EUT has been set to operate continuously on the lowest, middle and highest operation frequency Individually, and the EUT is operating at its maximum duty cycle For Radiated Emission, 3axis were chosen for testing for each applicable mode. For Conducted Test method, a temporary antenna connector is provided by the manufacture. All radiated spurious emission and conducted interference modes have been pre scanned.	

6. Duty Cycle Measurement

2.4GHz WLAN (DTS) operation is possible in 20MHz channel bandwidths. The maximum achievable duty cycles for all modes were determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8MHz, VBW = 50MHz, and detector = Peak. The RBW and VBW were both greater than 50/T, where T is the minimum transmission duration, and the number of sweep points across T was greater than 100. The duty cycles are as follows:

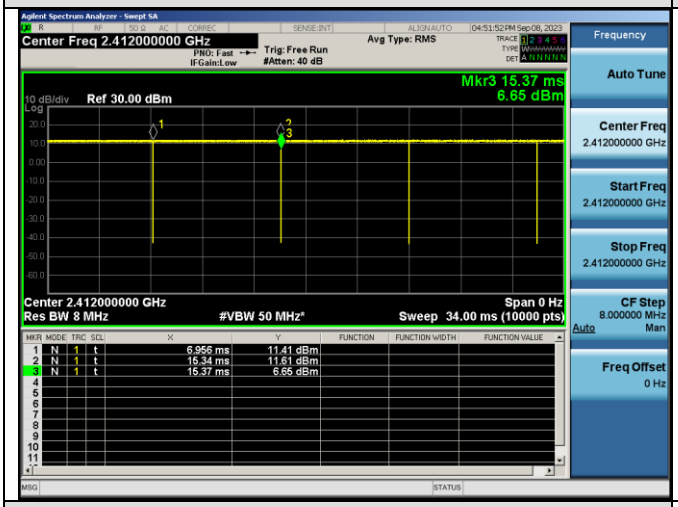
Operating mode	Data rates (Mbps)	Duty Cycle (%)	Duty Cycle Factor (dB)	1/ T Minimum VBW (kHz)	Average Factor (dB)
IEEE 802.11b	1	99.64	--	--	--
IEEE 802.11g	6	97.75	0.099	0.72	-0.20
IEEE 802.11n-HT20	MCS0	97.38	0.116	0.77	-0.23

Remark:

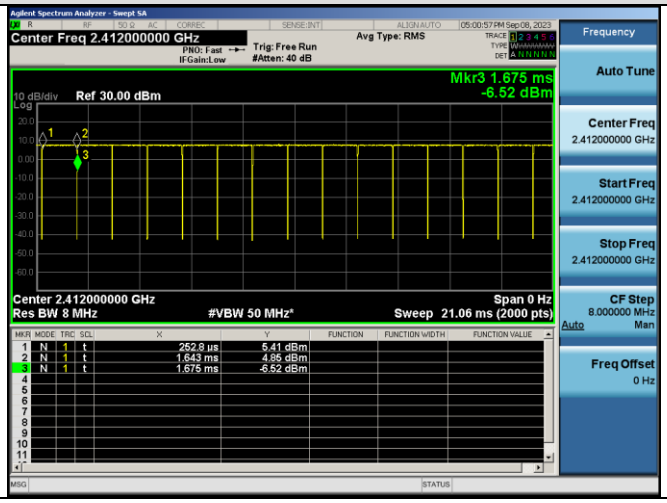
1. Duty Cycle factor = 10 * log (1/ Duty cycle)
2. Average factor = 20 log10 Duty Cycle
3. The duty cycle of each frequency band mode reflects the determination requirements of the low channel measurement value.

The test plots as follows:

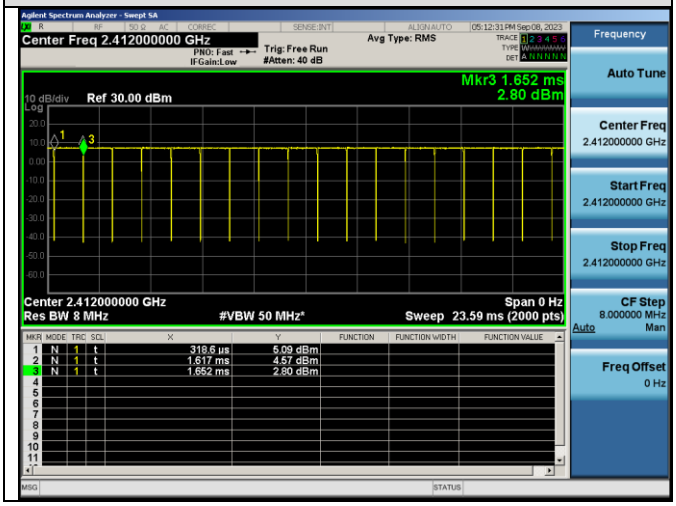
IEEE 802.11b



IEEE 802.11g



IEEE 802.11n-HT20



7. RF Output Power Measurement

7.1 Provisions Applicable

For DTSs employing digital modulation techniques operating in the bands 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1 W.

7.2 Measurement Procedure

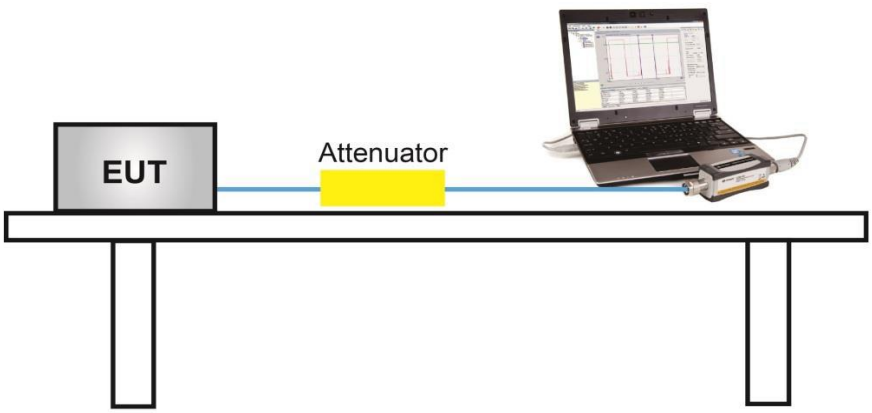
☒Method PM is Measurement using an RF Peak power meter. The procedure for this method is as follows:

1. The testing follows the ANSI C63.10 Section 11.9.1.3
2. The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall use a fast-responding diode detector.

☒Method PM is Measurement using an RF average power meter. The procedure for this method is as follows:

1. The testing follows the ANSI C63.10 Section 11.9.2.3
2. Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the following conditions are satisfied:
3. The EUT is configured to transmit continuously, or to transmit with a constant duty cycle.
4. At all times when the EUT is transmitting, it shall be transmitting at its maximum power control level.
5. The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.
6. Determine according to the duty cycle of the equipment: when it is less than 98%, follow the steps below.
7. Measure the average power of the transmitter. This measurement is an average over both the ON and OFF periods of the transmitter.
8. Adjust the measurement in dBm by adding [10 log (1 / D)], where D is the duty cycle {e.g., [10 log (1 / 0.25)], if the duty cycle is 25%}.
9. Record the test results in the report.

7.3 Measurement Setup (Block Diagram of Configuration)



7.4 Measurement Result

Test Data of Conducted Output Power					
Test Mode	Test Channel (MHz)	Average Power (dBm)	Peak Power (dBm)	Limits (dBm)	Pass or Fail
802.11b	2412	12.42	14.88	≤30	Pass
	2437	12.65	15.07	≤30	Pass
	2462	12.17	14.56	≤30	Pass
802.11g	2412	10.30	17.64	≤30	Pass
	2437	10.32	17.53	≤30	Pass
	2462	10.01	17.43	≤30	Pass
802.11n20	2412	10.25	17.49	≤30	Pass
	2437	10.41	17.75	≤30	Pass
	2462	9.87	17.19	≤30	Pass

8. 6dB Bandwidth Measurement

8.1 Provisions Applicable

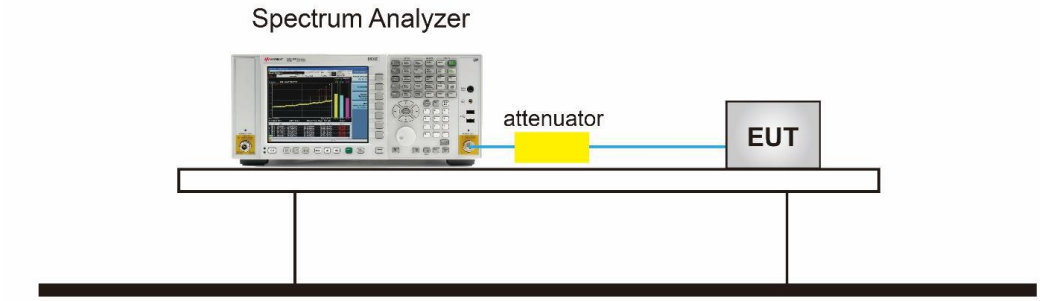
The minimum 6dB bandwidth shall be 500 kHz.

8.2 Measurement Procedure

The testing follows the ANSI C63.10 Section 6.9.3 (OBW) and 11.8.1 (6dB BW).

1. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. For 6dB Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement.
4. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 1-5% of the emission bandwidth and set the Video bandwidth (VBW) ≥ 3 * RBW.
5. Detector = peak
6. Trace mode = max hold.
7. Sweep = auto couple.
8. Allow the trace to stabilize.
9. Measure and record the results in the test report.

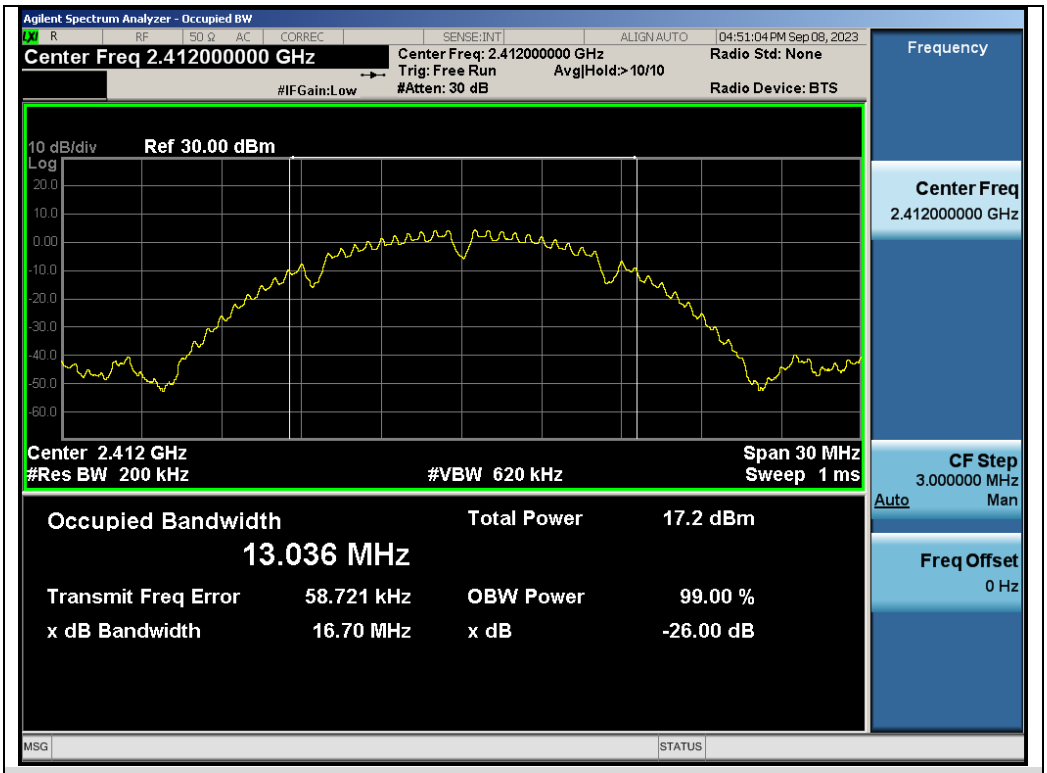
8.3 Measurement Setup (Block Diagram of Configuration)



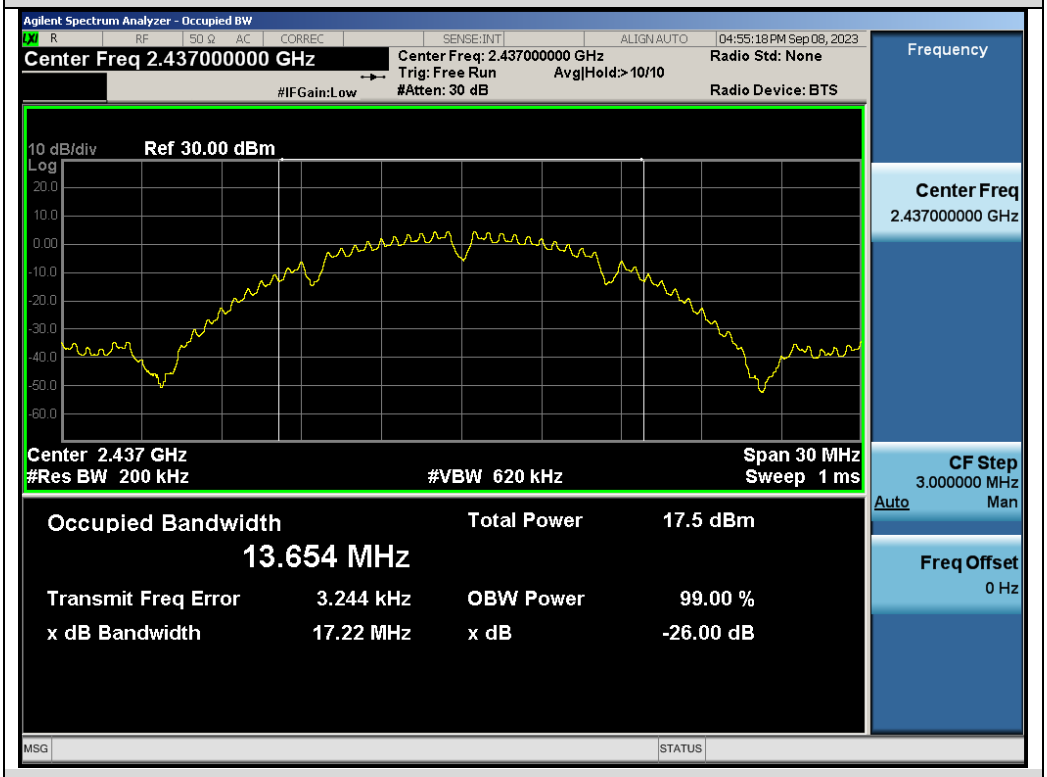
8.4 Measurement Results

Test Data of Occupied Bandwidth and DTS Bandwidth					
Test Mode	Test Channel (MHz)	99% Occupied Bandwidth (MHz)	DTS Bandwidth (MHz)	DTS Bandwidth Limits (MHz)	Pass or Fail
802.11b	2412	13.036	8.545	≥0.5	Pass
	2437	13.654	8.566	≥0.5	Pass
	2462	12.964	8.074	≥0.5	Pass
802.11g	2412	16.437	15.100	≥0.5	Pass
	2437	16.609	15.333	≥0.5	Pass
	2462	16.408	15.097	≥0.5	Pass
802.11n20	2412	17.502	15.113	≥0.5	Pass
	2437	17.631	15.950	≥0.5	Pass
	2462	17.458	15.108	≥0.5	Pass

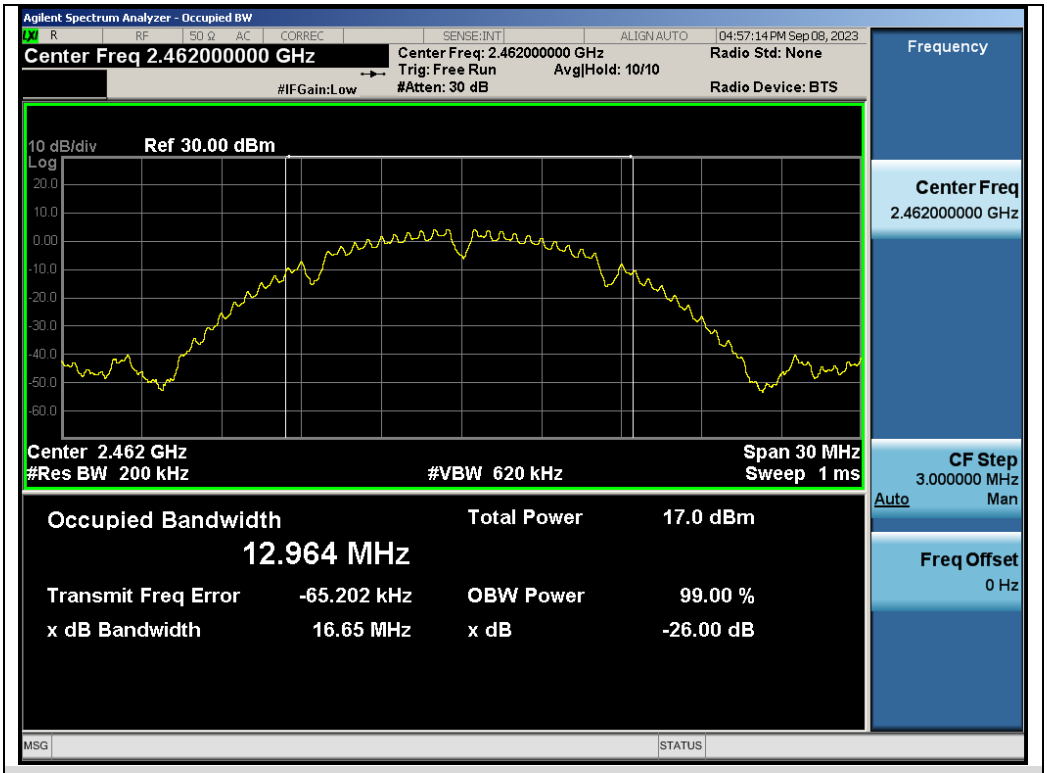
Test Graphs of Occupied Bandwidth



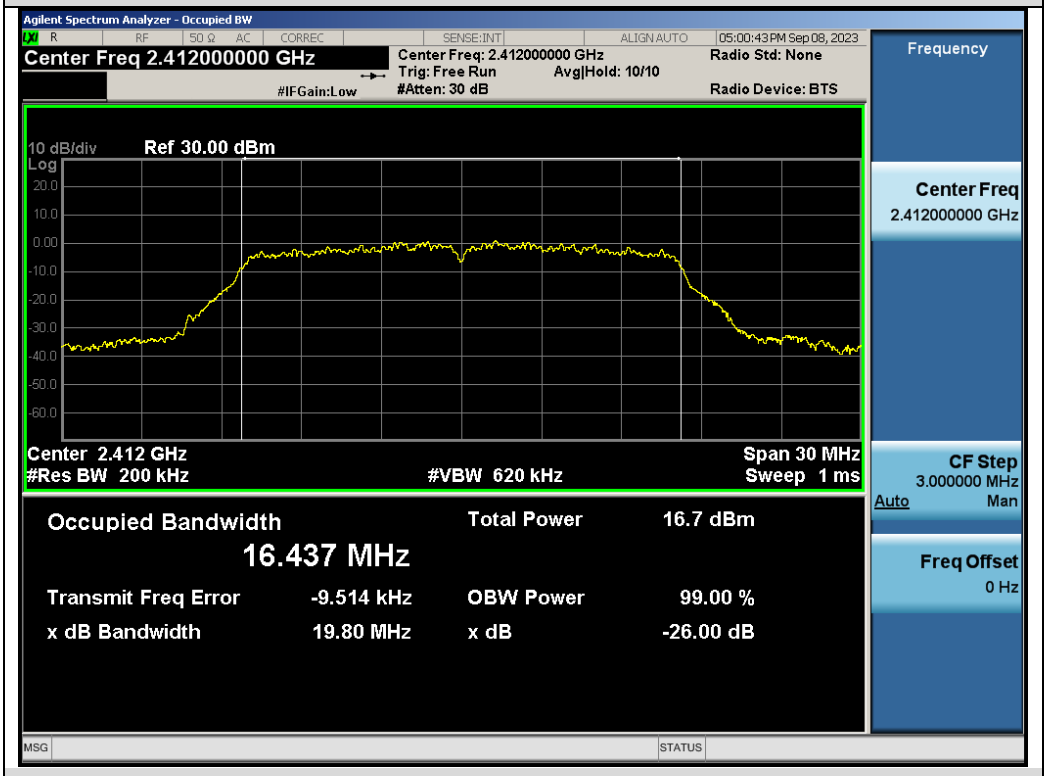
Test_Graph_802.11b_ANT1_2412_1Mbps_OBW



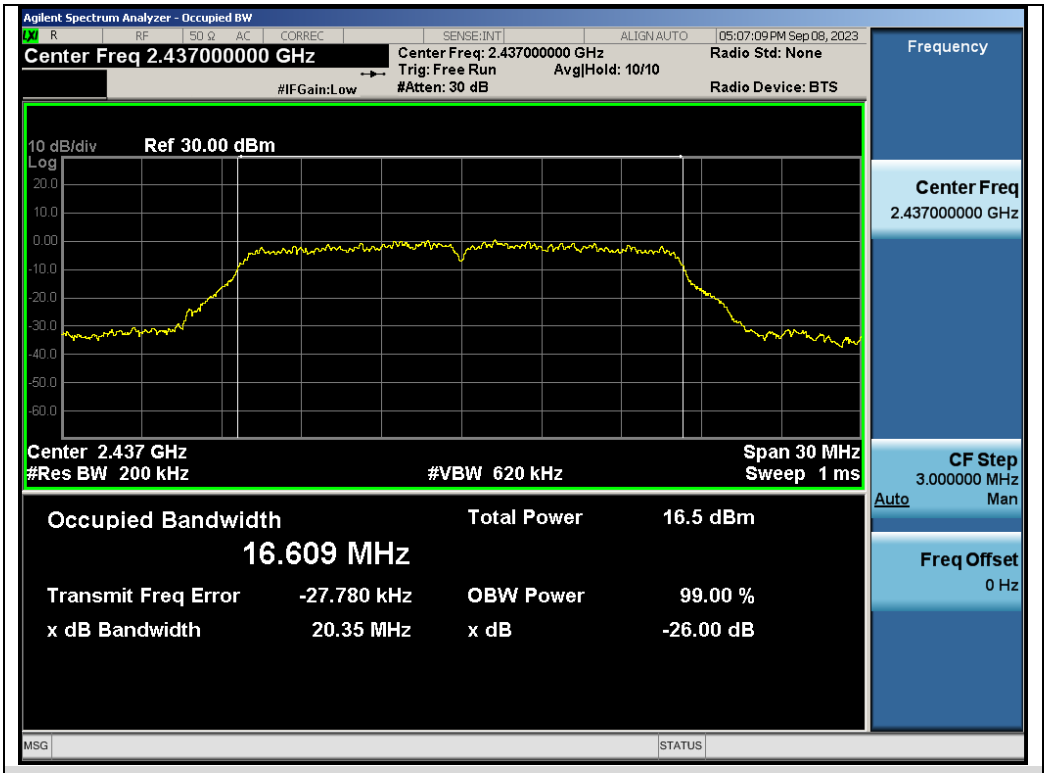
Test_Graph_802.11b_ANT1_2437_1Mbps_OBW



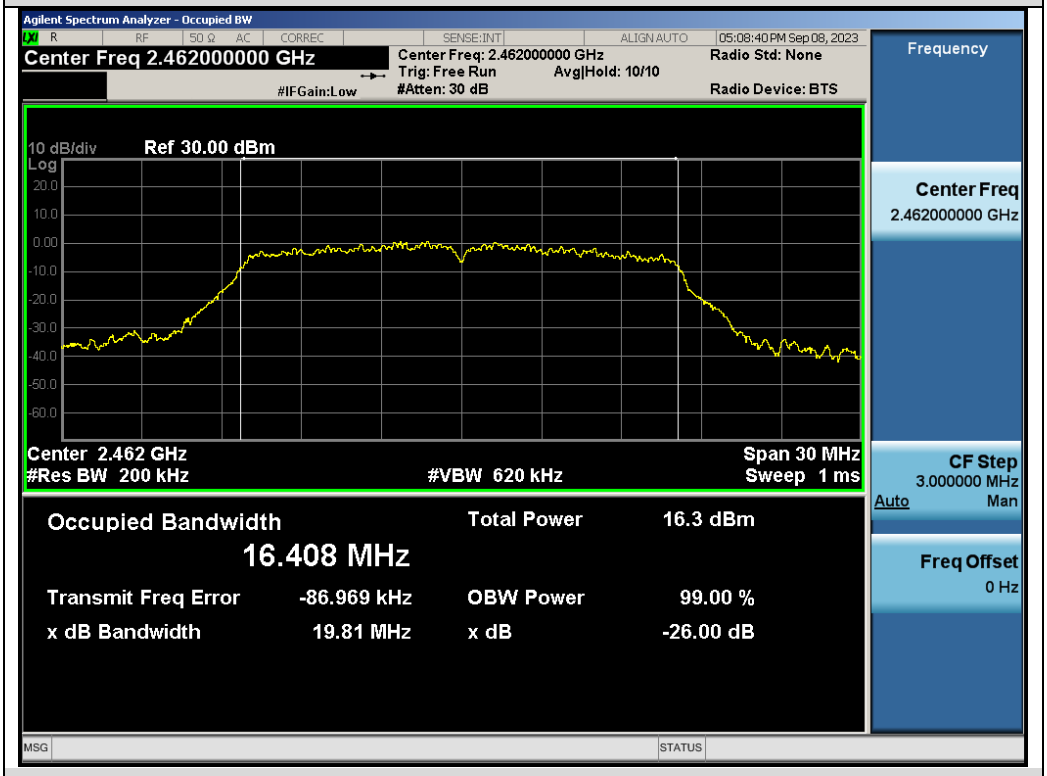
Test_Graph_802.11b_ANT1_2462_1Mbps_OBW



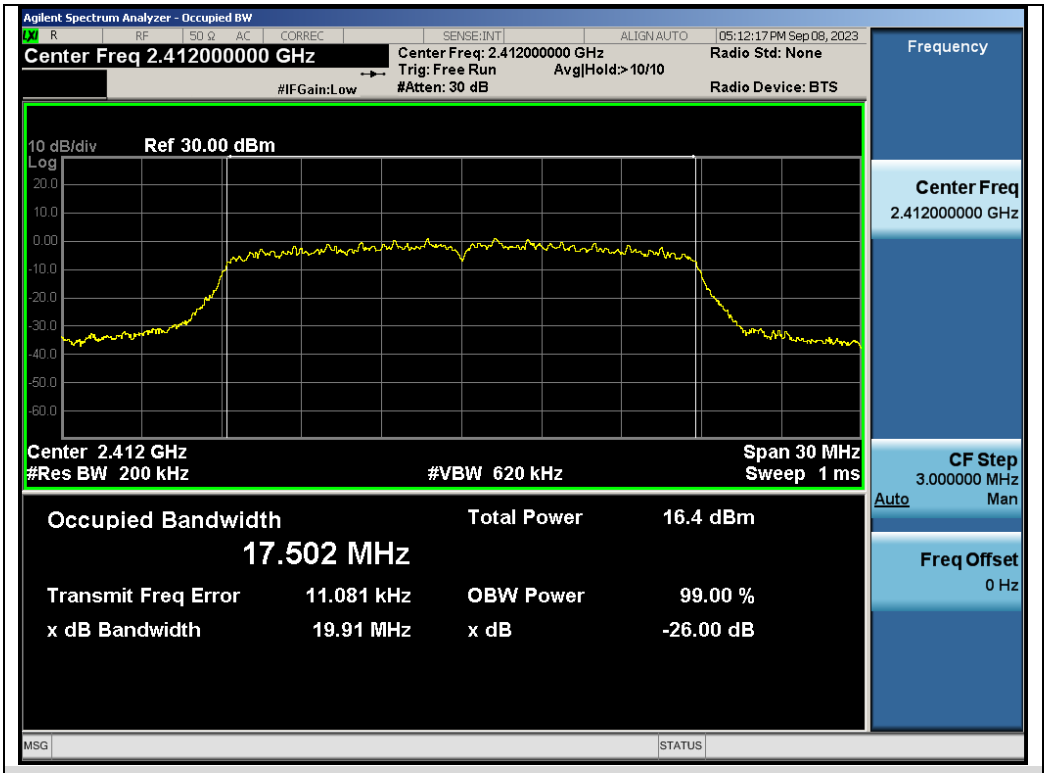
Test_Graph_802.11g_ANT1_2412_6Mbps_OBW



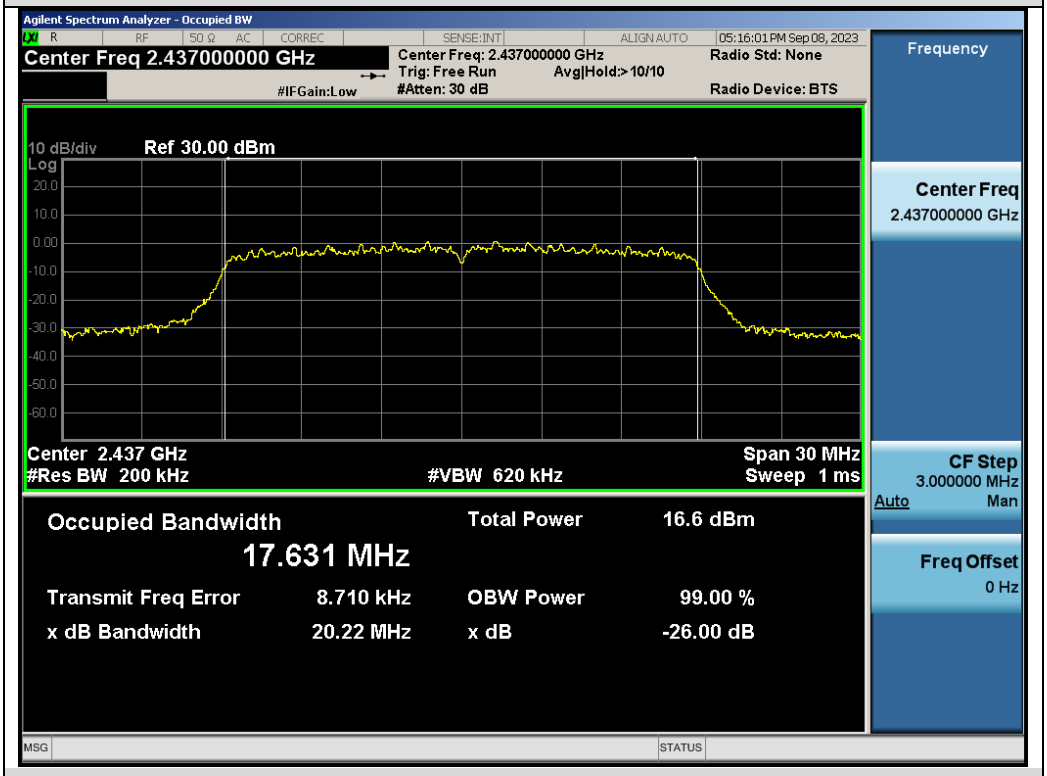
Test_Graph_802.11g_ANT1_2437_6Mbps_OBW



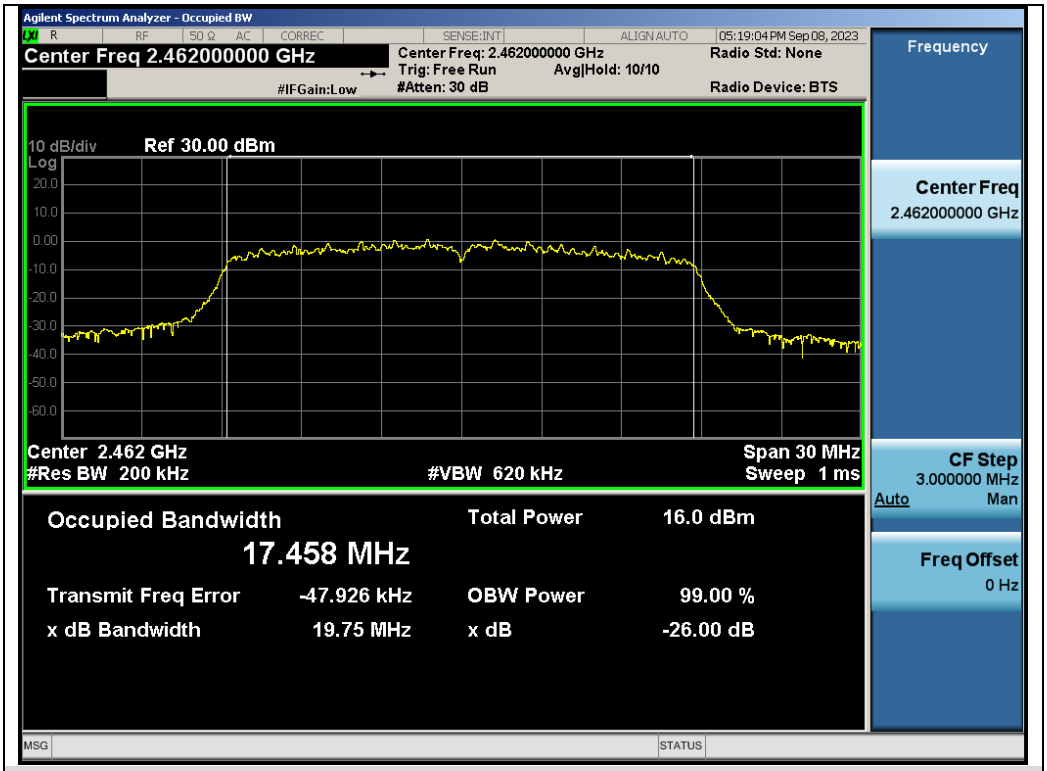
Test_Graph_802.11g_ANT1_2462_6Mbps_OBW



Test_Graph_802.11n20_ANT1_2412_MCS0_OBW

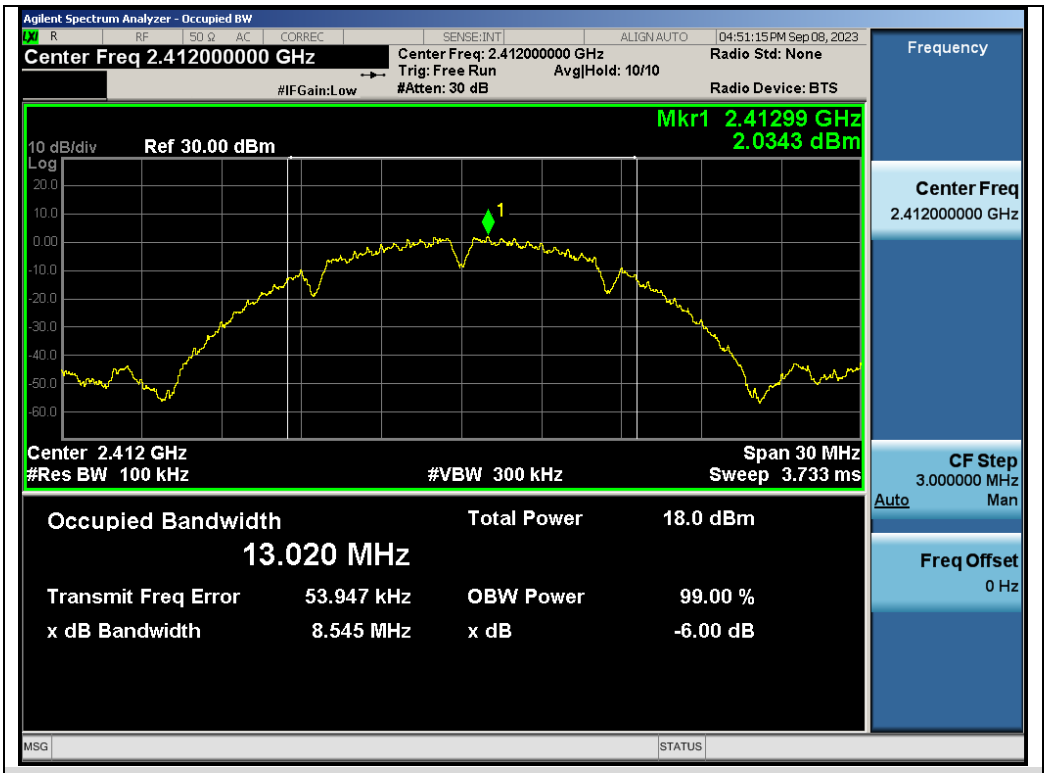


Test_Graph_802.11n20_ANT1_2437_MCS0_OBW

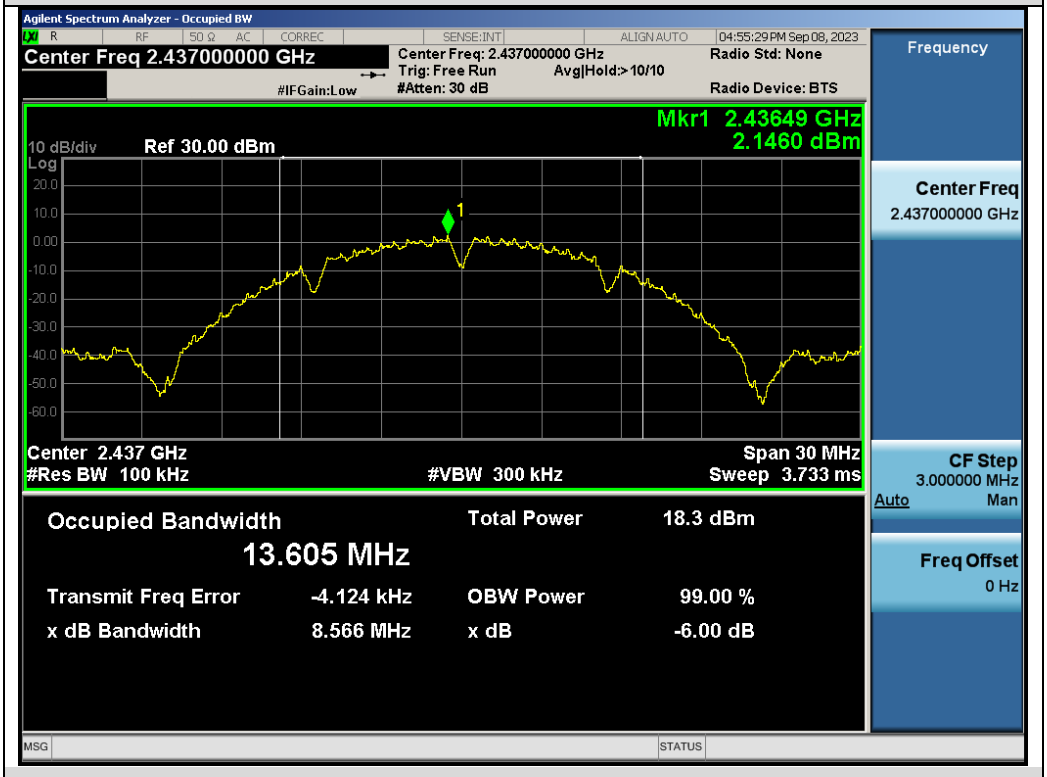


Test_Graph_802.11n20_ANT1_2462_MCS0_OBW

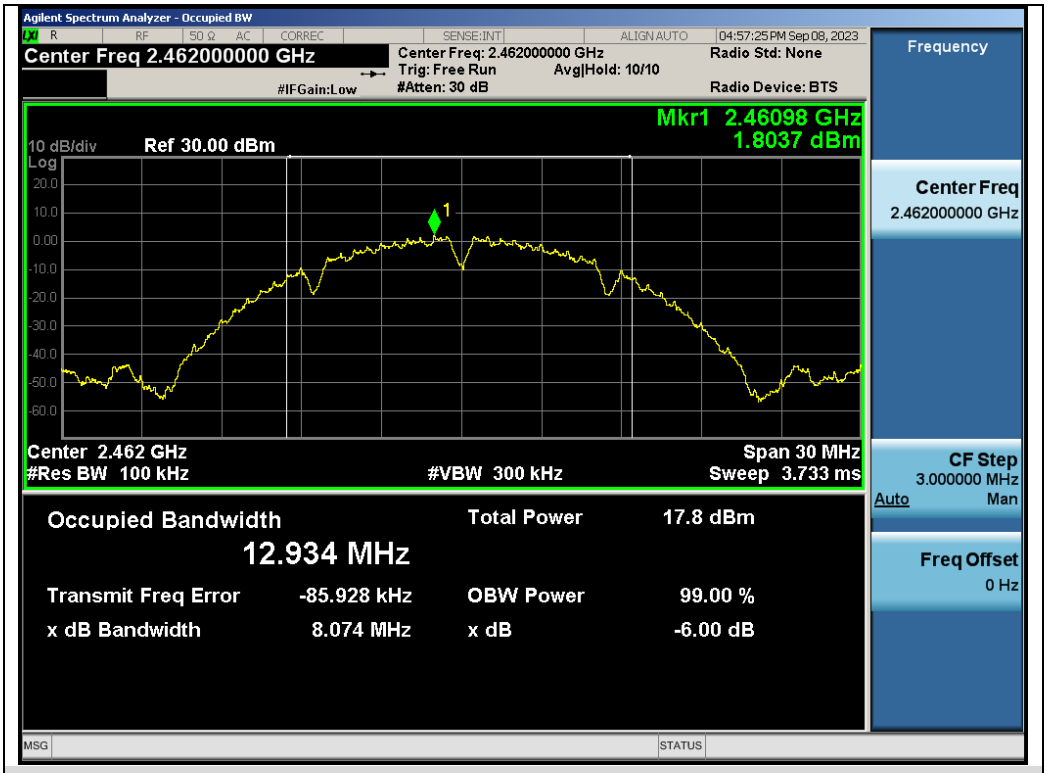
Test Graphs of DTS Bandwidth



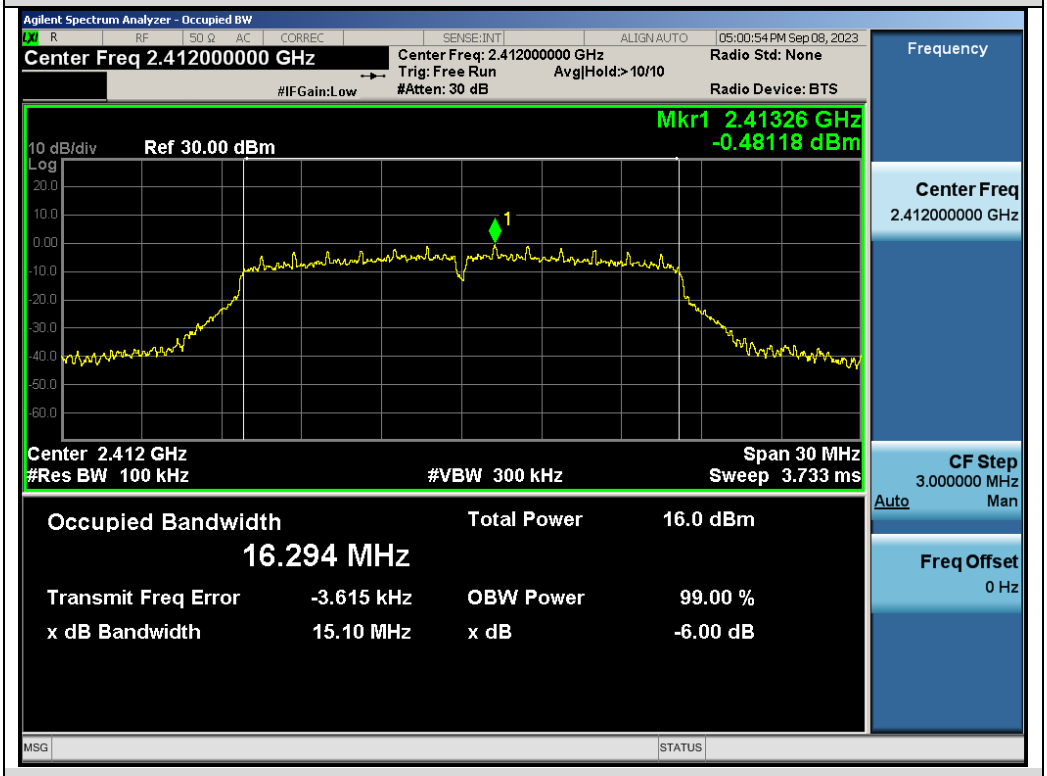
Test_Graph_802.11b_ANT1_2412_1Mbps_DTSBW



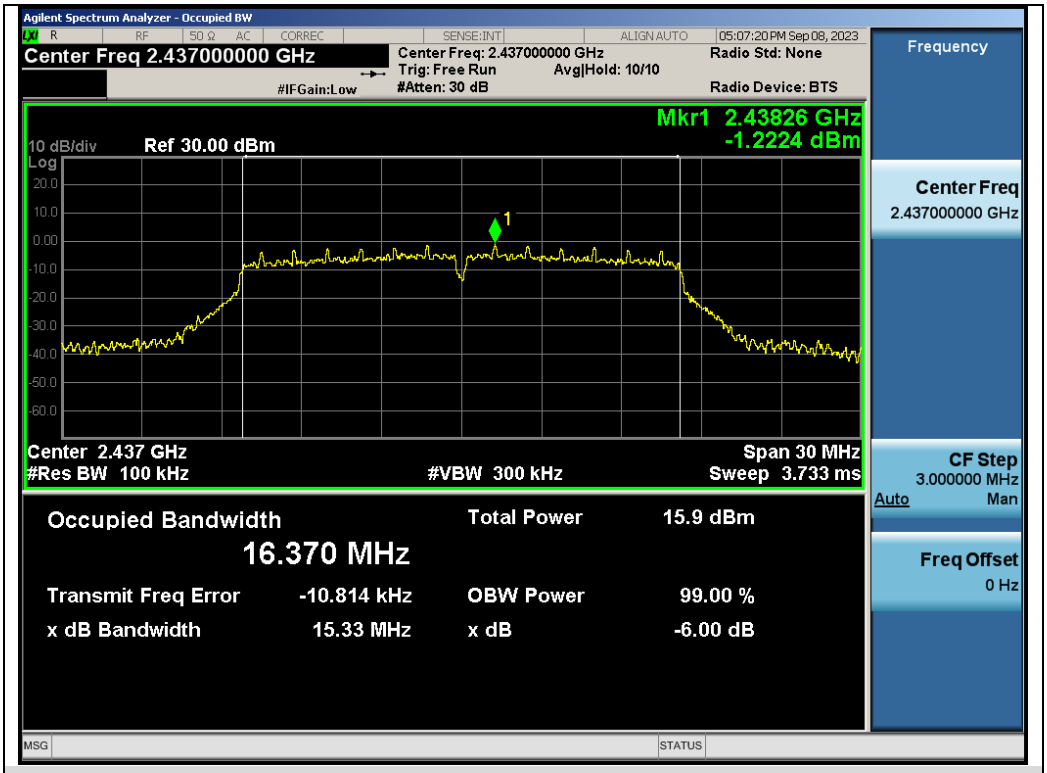
Test_Graph_802.11b_ANT1_2437_1Mbps_DTSBW



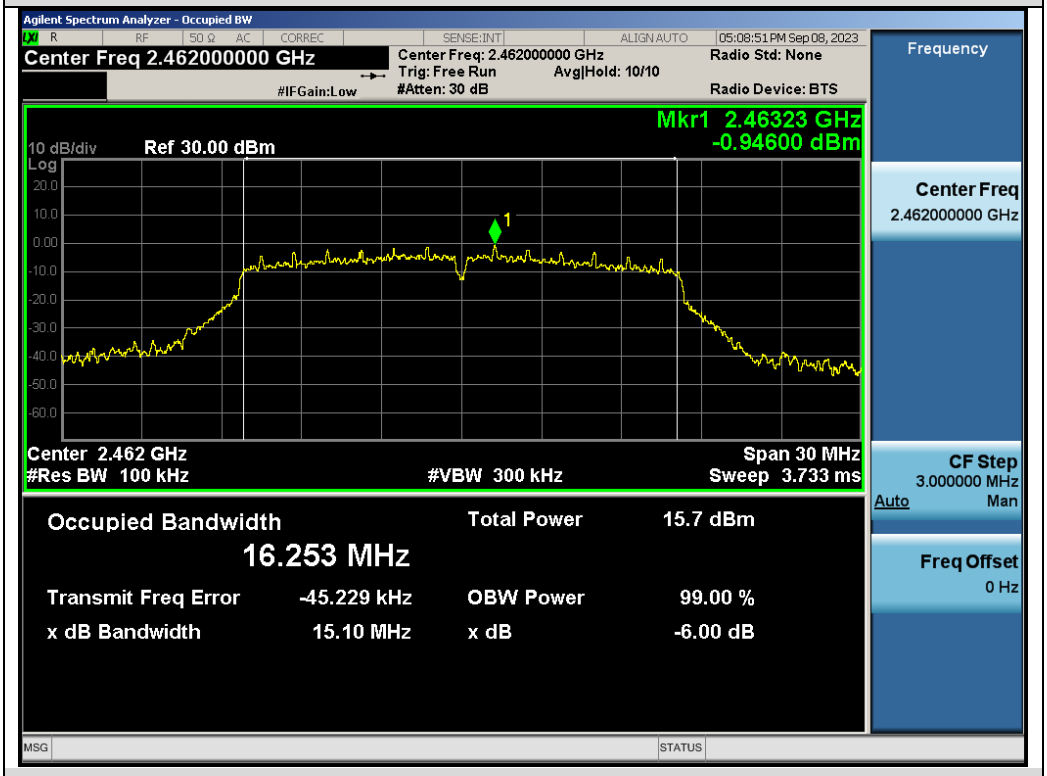
Test_Graph_802.11b_ANT1_2462_1Mbps_DTSBW



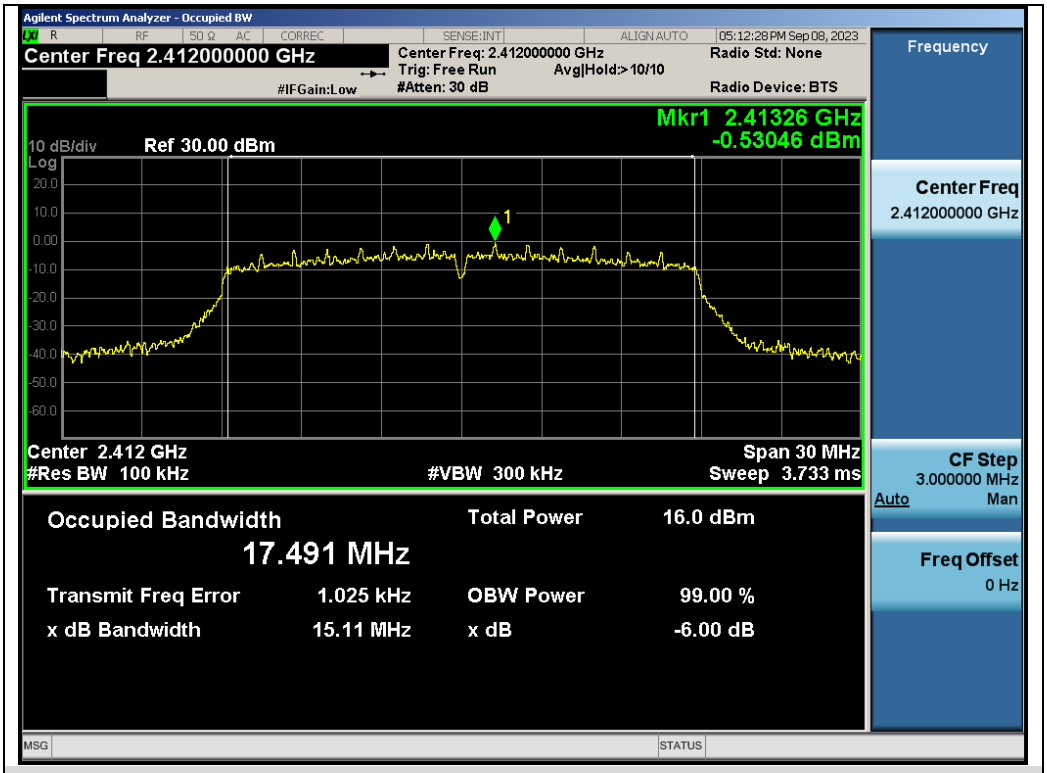
Test_Graph_802.11g_ANT1_2412_6Mbps_DTSBW



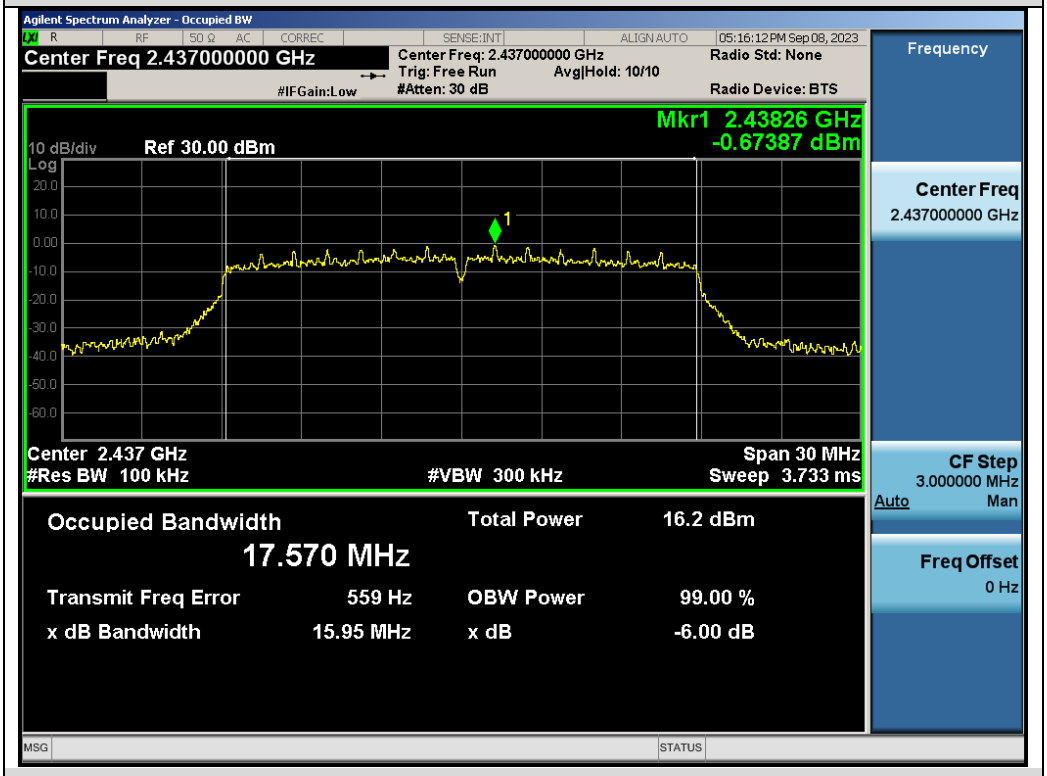
Test_Graph_802.11g_ANT1_2437_6Mbps_DTSBW



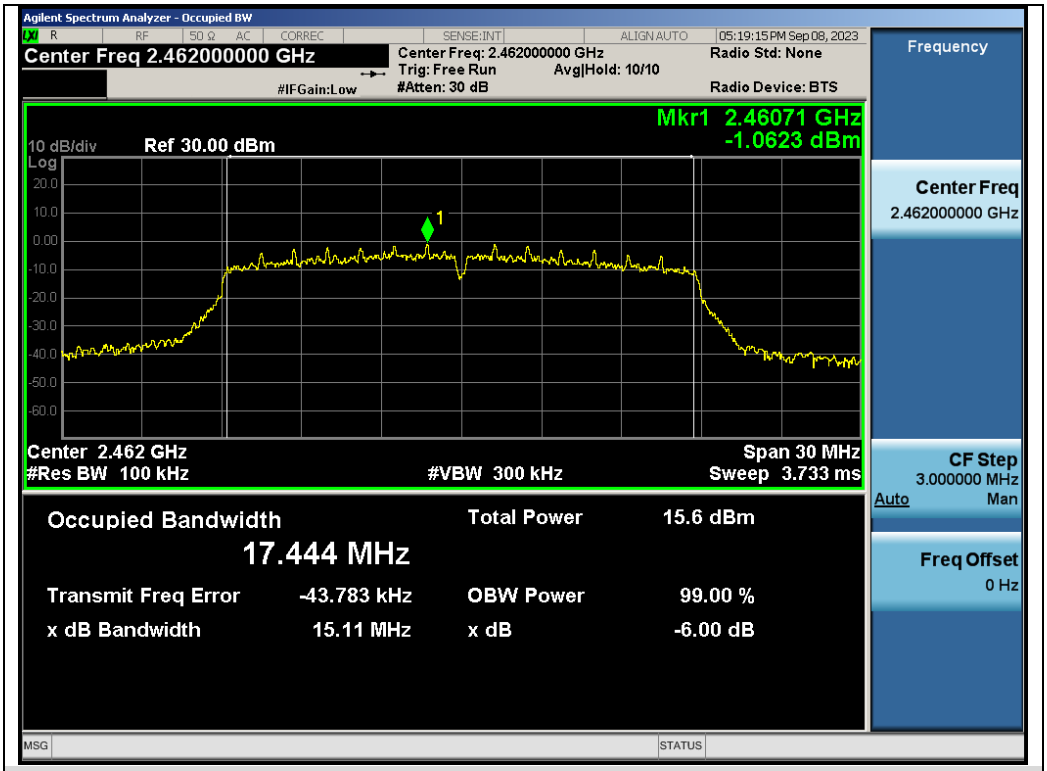
Test_Graph_802.11g_ANT1_2462_6Mbps_DTSBW



Test_Graph_802.11n20_ANT1_2412_MCS0_DTSBW



Test_Graph_802.11n20_ANT1_2437_MCS0_DTSBW



Test_Graph_802.11n20_ANT1_2462_MCS0_DTSBW

9. Power Spectral Density Measurement

9.1 Provisions Applicable

The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

9.2 Measurement Procedure

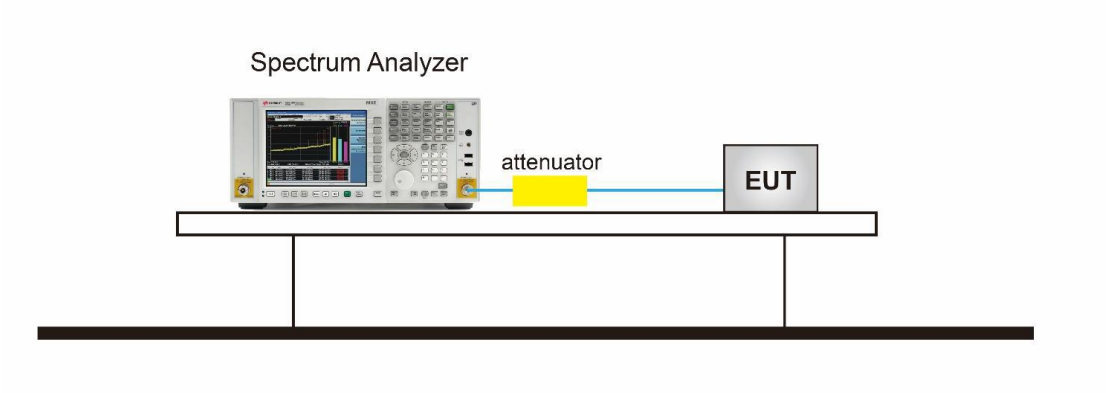
☒For Peak power spectral density test:

1. The testing follows the ANSI C63.10 Section 11.10.2 Method PKPSD.
2. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
3. Set the RBW = 20 kHz.
4. Set the VBW ≥ [3 × RBW].
5. Set the Span ≥ [1.5 × DTS bandwidth].
6. Sweep time=Auto couple.
7. Detector function=Peak.
8. Trace Mode=Max hold.
9. When the measurement bandwidth of Maximum PSD is specified in 3 kHz, add a constant factor 10*log(3kHz/20kHz) = -8.23 dB to the measured result.
10. Allow trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission.
11. The indicated level is the peak output power, after any corrections for external attenuators and cables.

☐For Average power spectral density test:

1. The testing follows the ANSI C63.10 Section 11.10.5 Method AVPSD.
2. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator.
3. Set Span to at least 1.5 times the OBW.
4. Set RBW to:3 kHz ≤ RBW ≤ 100 kHz.
5. Set VBW≥[3×RBW].
6. Sweep Time=Auto couple.
7. Detector function=RMS (i.e., power averaging).
8. Trace average at least 100 traces in power averaging (rms) mode.
9. When the measurement bandwidth of Maximum PSD is specified in 3 kHz, add a constant factor 10*log(3kHz/20kHz) = -8.23 dB to the measured result.
10. Determine according to the duty cycle of the equipment: when it is less than 98%, follow the steps below.
11. Add [10 log (1 / D)], where D is the duty cycle, to the measured power to compute the average power during the actual transmission times (because the measurement represents an average over both the ON and OFF times of the transmission). For example, add [10 log (1/0.25)] = 6 dB if the duty cycle is 25%.
12. Record the test results in the report.

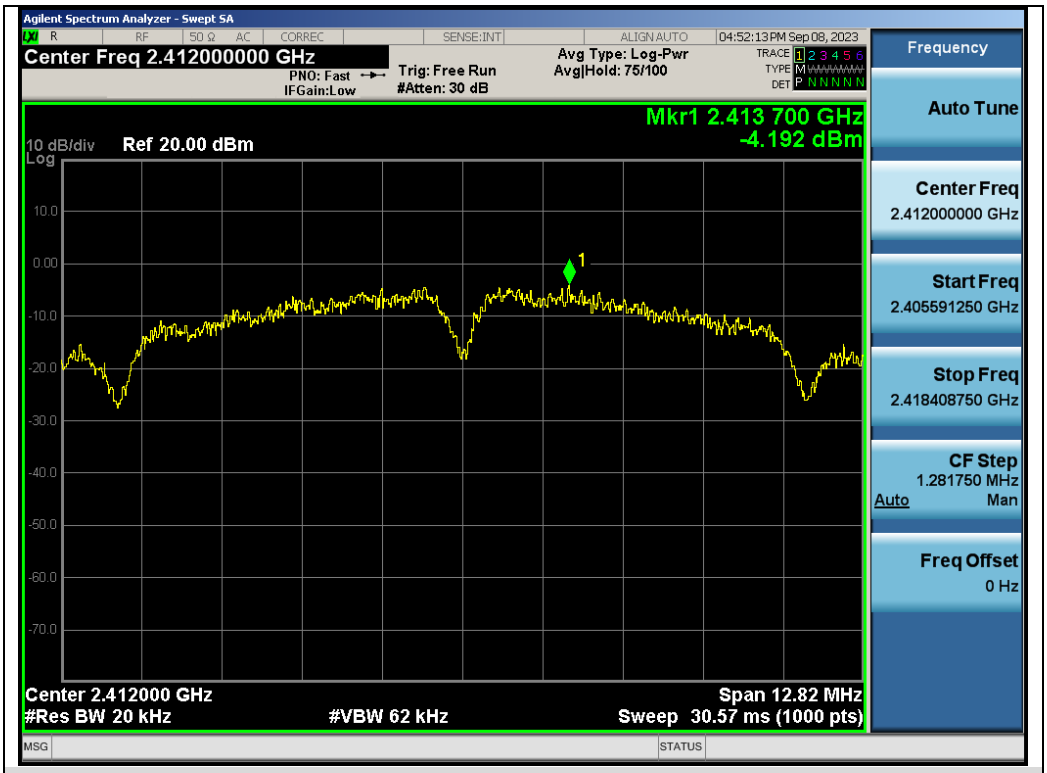
9.3 Measurement Setup (Block Diagram of Configuration)



9.4 Measurement Result

Test Data of Conducted Output Power Spectral Density					
Test Mode	Test Channel (MHz)	Power density (dBm/20kHz)	Power density (dBm/3kHz)	Limit (dBm/3kHz)	Pass or Fail
802.11b	2412	-4.192	-12.431	≤8	Pass
	2437	-3.858	-12.097	≤8	Pass
	2462	-3.633	-11.872	≤8	Pass
802.11g	2412	-7.258	-15.497	≤8	Pass
	2437	-6.518	-14.757	≤8	Pass
	2462	-7.769	-16.008	≤8	Pass
802.11n20	2412	-6.136	-14.375	≤8	Pass
	2437	-5.983	-14.222	≤8	Pass
	2462	-5.914	-14.153	≤8	Pass

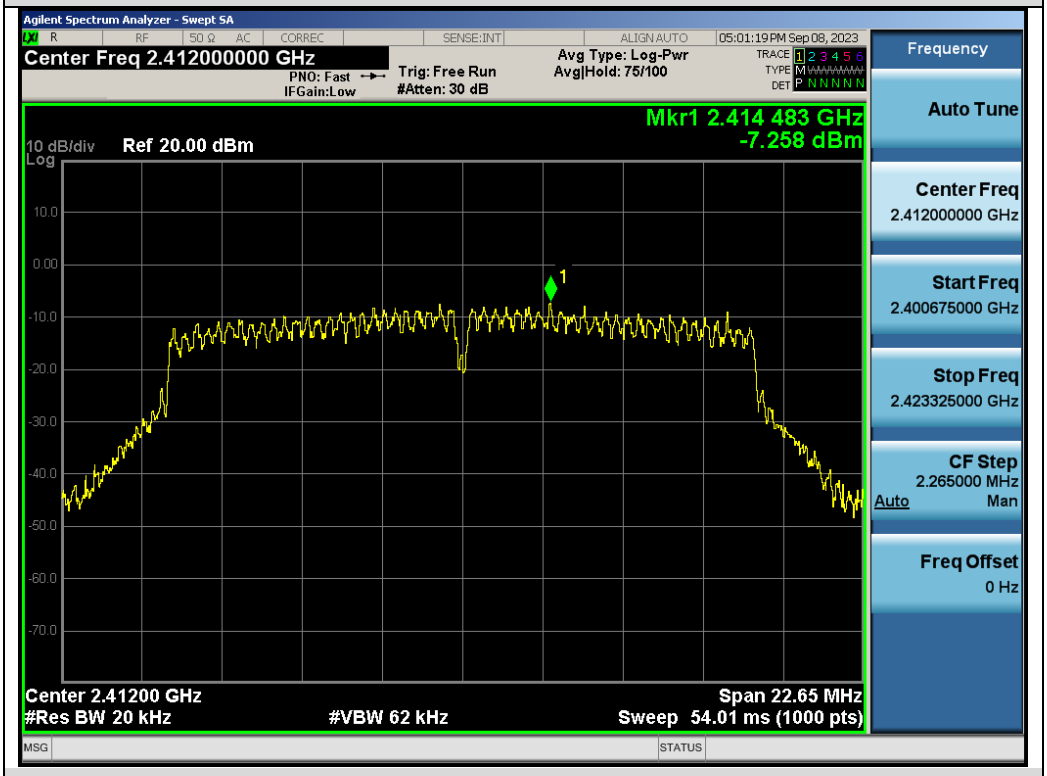
Test Graphs of Conducted Output Power Spectral Density



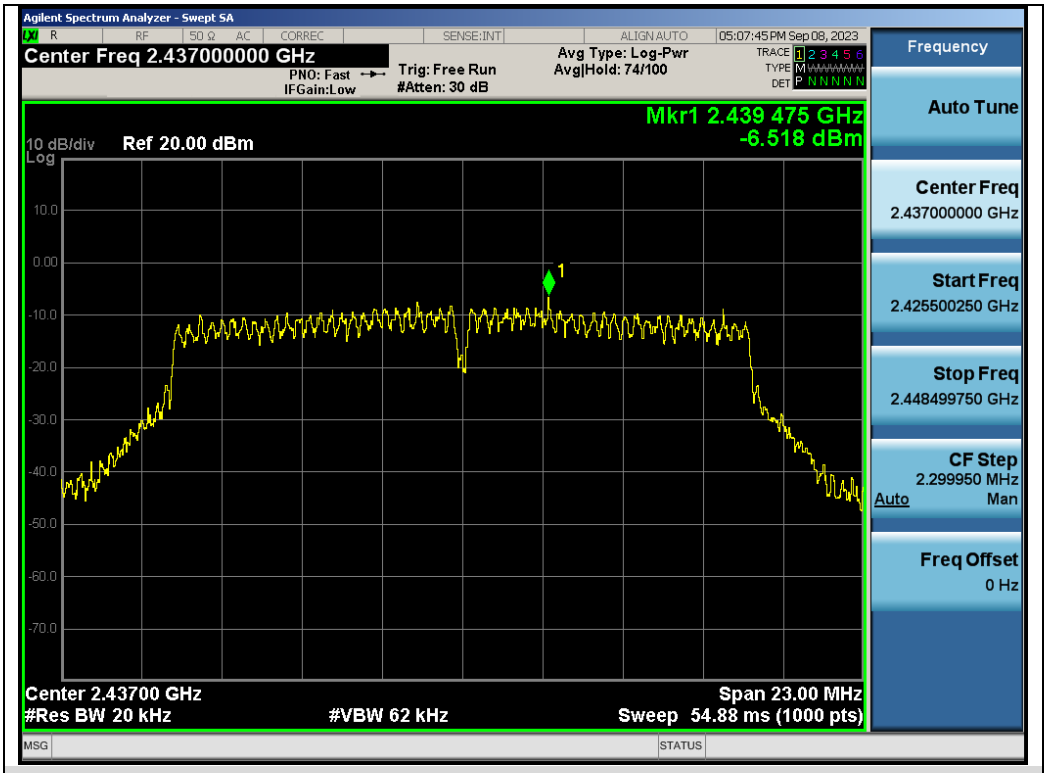
Test_Graph_802.11b_ANT1_2412_1Mbps_PSD

Test_Graph_802.11b_ANT1_2437_1Mbps_PSD

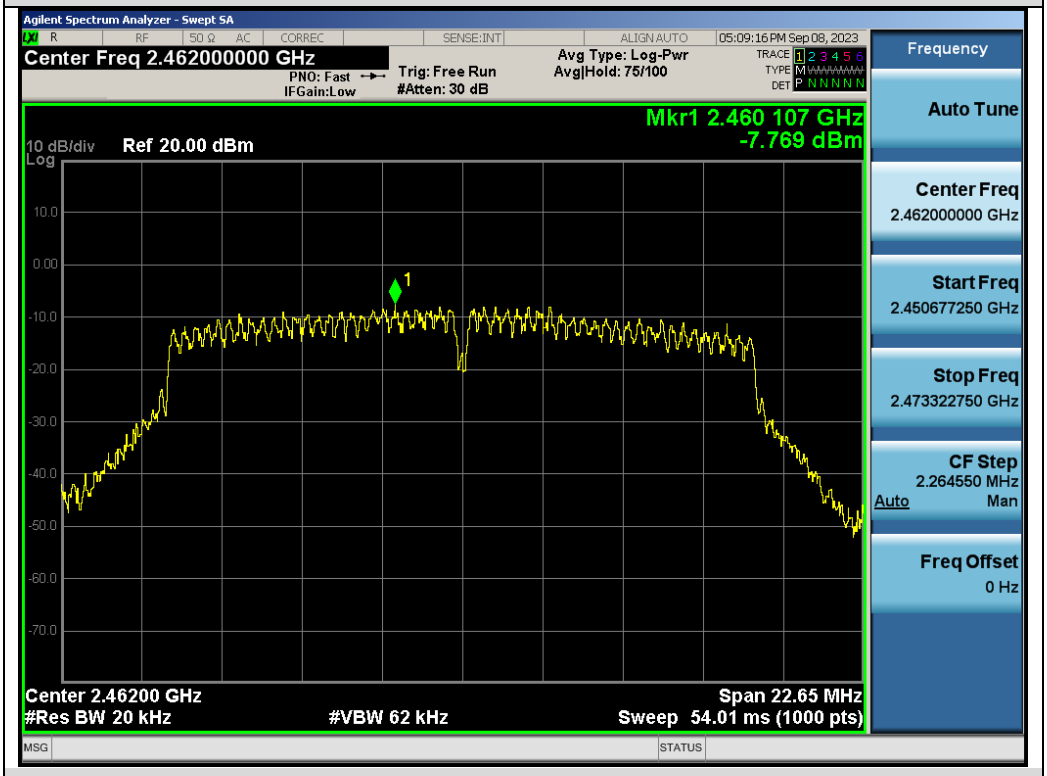
Test_Graph_802.11b_ANT1_2462_1Mbps_PSD



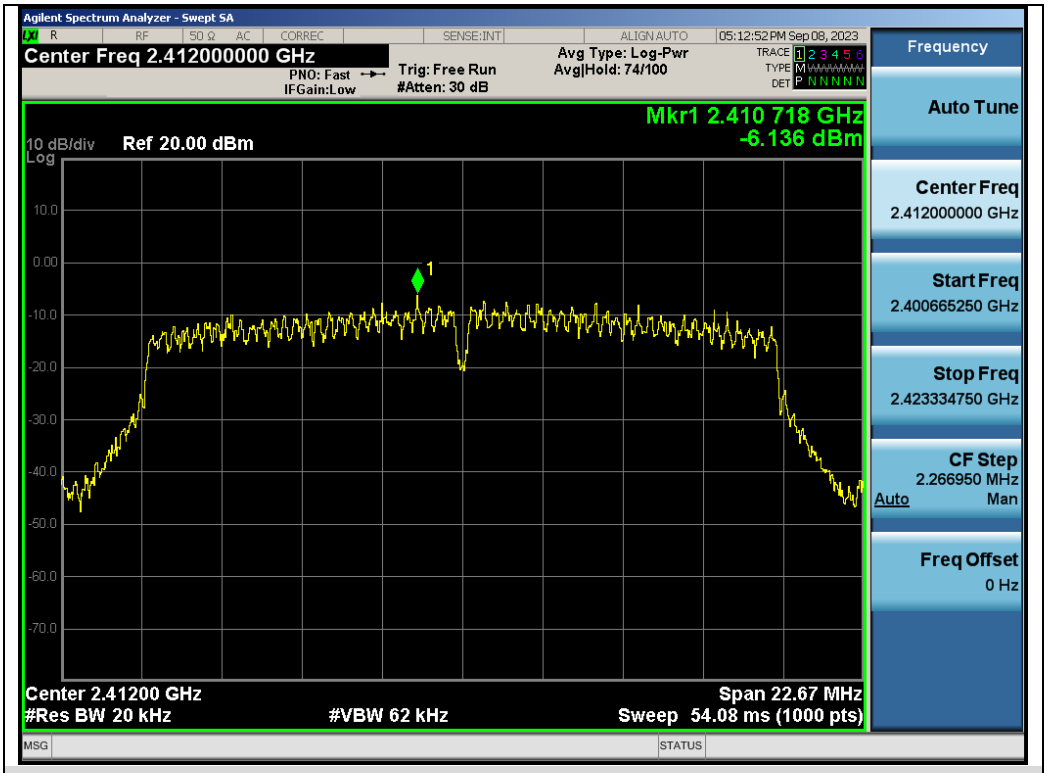
Test_Graph_802.11g_ANT1_2412_6Mbps_PSD



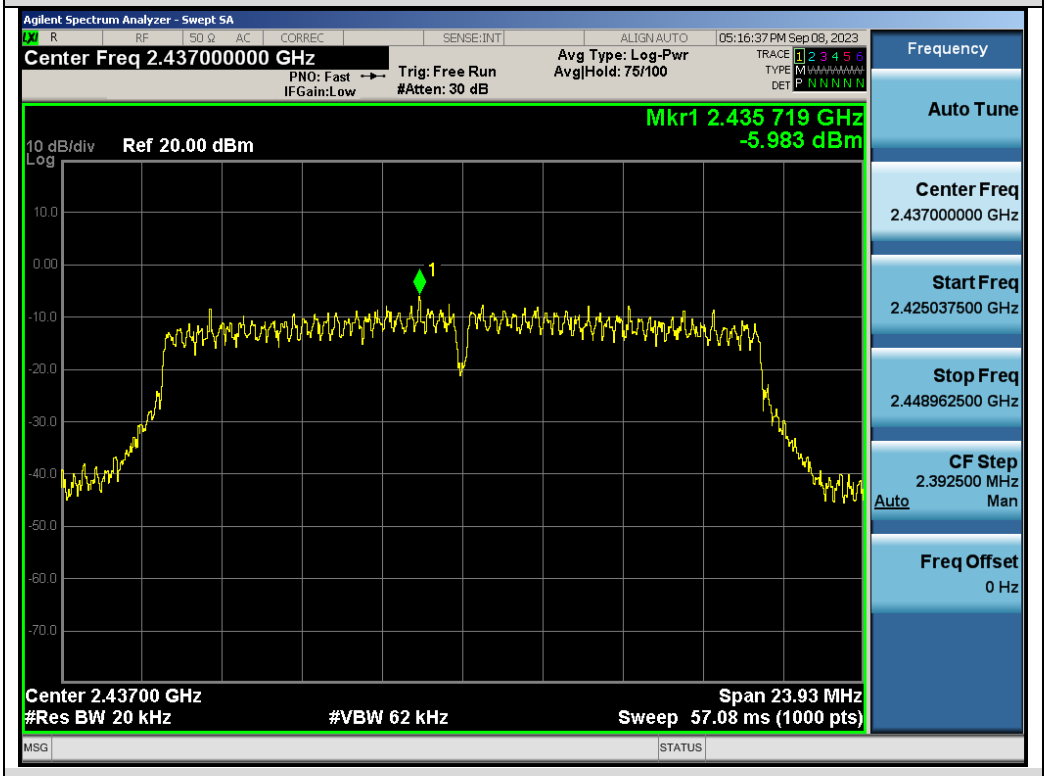
Test_Graph_802.11g_ANT1_2437_6Mbps_PSD



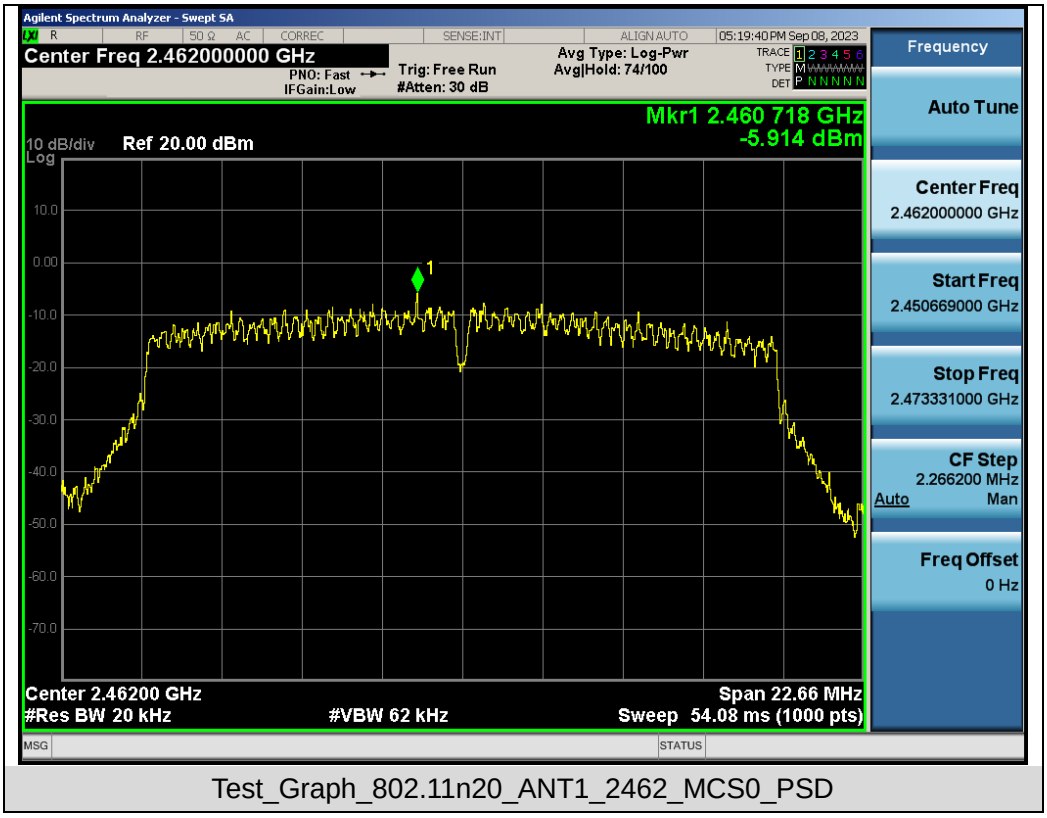
Test_Graph_802.11g_ANT1_2462_6Mbps_PSD



Test_Graph_802.11n20_ANT1_2412_MCS0_PSD



Test_Graph_802.11n20_ANT1_2437_MCS0_PSD



Test_Graph_802.11n20_ANT1_2462_MCS0_PSD

10. Conducted Band Edge and Out-of-Band Emissions

10.1 Provisions Applicable

In any 100kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.

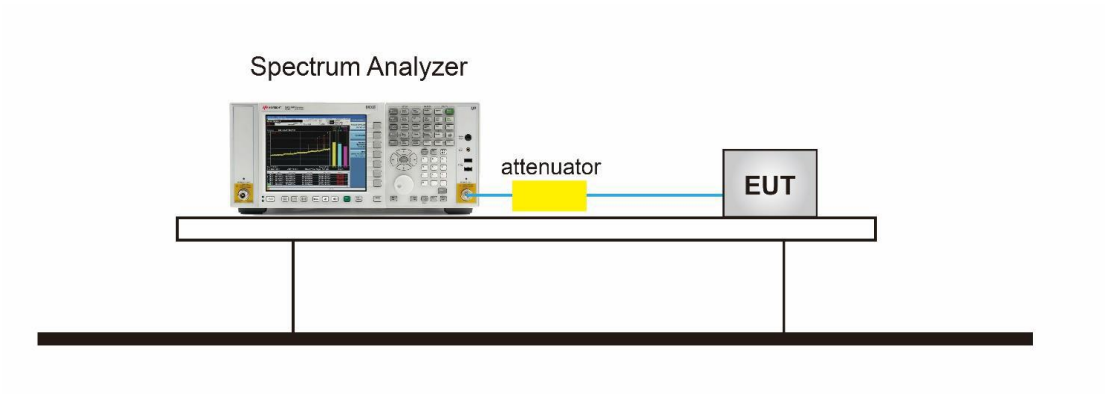
10.2 Measurement Procedure

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
Use the following spectrum analyzer settings:

- Step 1: Measurement Procedure In-Band Reference Level
  1. Set instrument center frequency to DTS channel center frequency.
  2. Set the span to ≥ 1.5 times the DTS bandwidth.
  3. Set the RBW = 100 kHz.
  4. Set the VBW ≥ 3 x RBW.
  5. Detector = peak.
  6. Sweep time = auto couple.
  7. Trace mode = max hold.
  8. Allow trace to fully stabilize.
  9. Use the peak marker function to determine the maximum PSD level.
  10. Note that the channel found to contain the maximum PSD level can be used to establish the reference level.
- Step 2: Measurement Procedure Out of Band Emission
  1. Set RBW = 100 kHz.
  2. Set VBW ≥ 300 kHz.
  3. Detector = peak.
  4. Sweep = auto couple.
  5. Trace Mode = max hold.
  6. Allow trace to fully stabilize.
  7. Use the peak marker function to determine the maximum amplitude level.

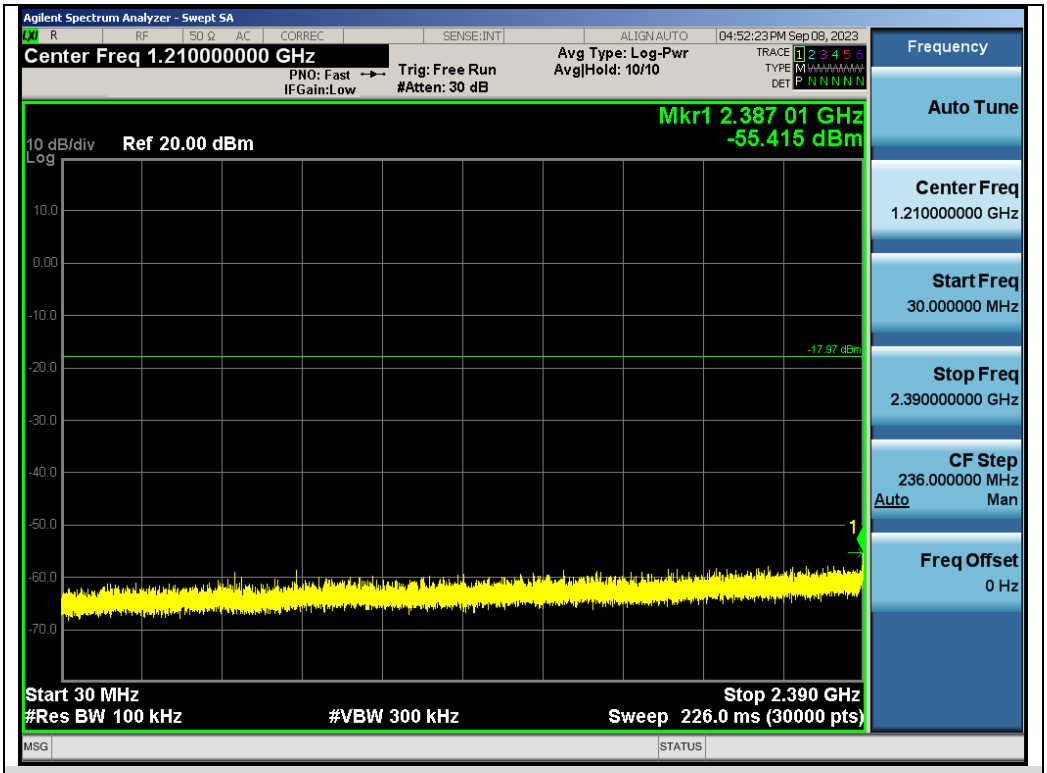
Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

10.3 Measurement Setup (Block Diagram of Configuration)

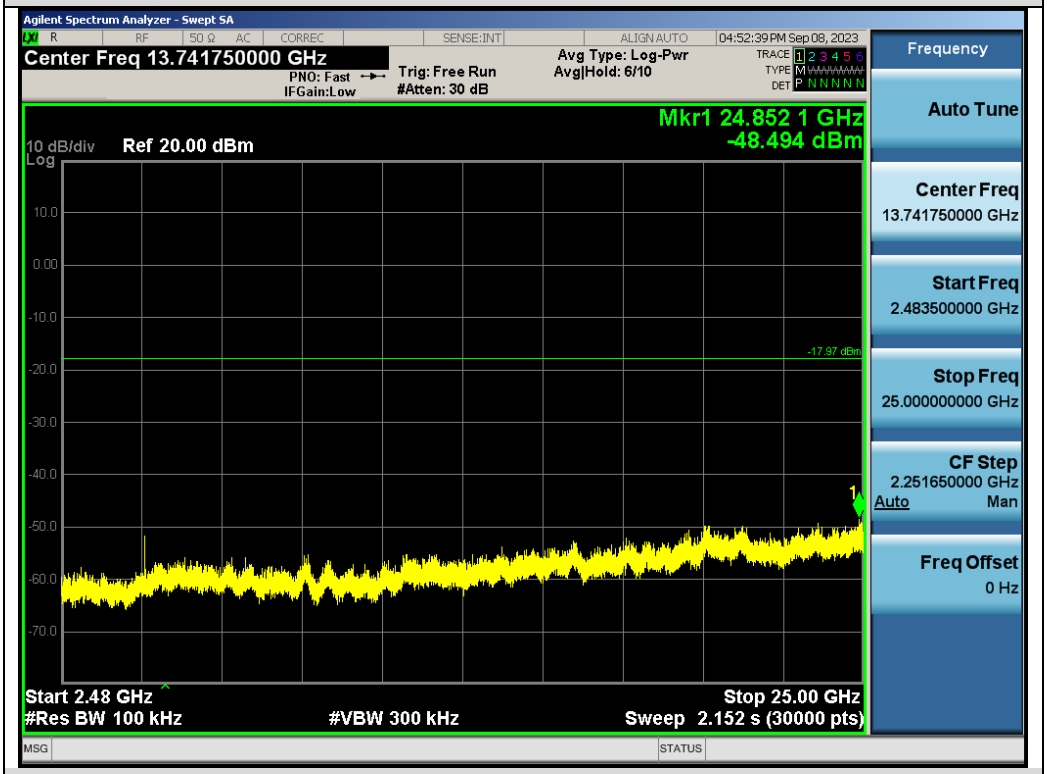


10.4 Measurement Results

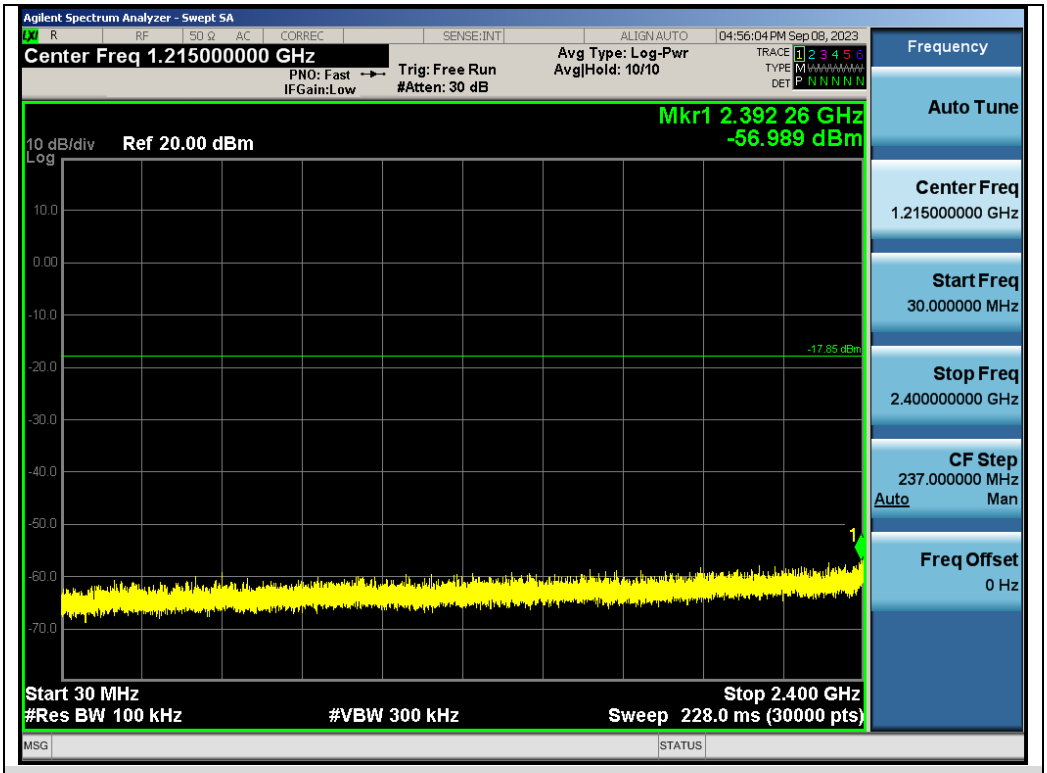
Test Graphs of Spurious Emissions in Non-Restricted Frequency Bands



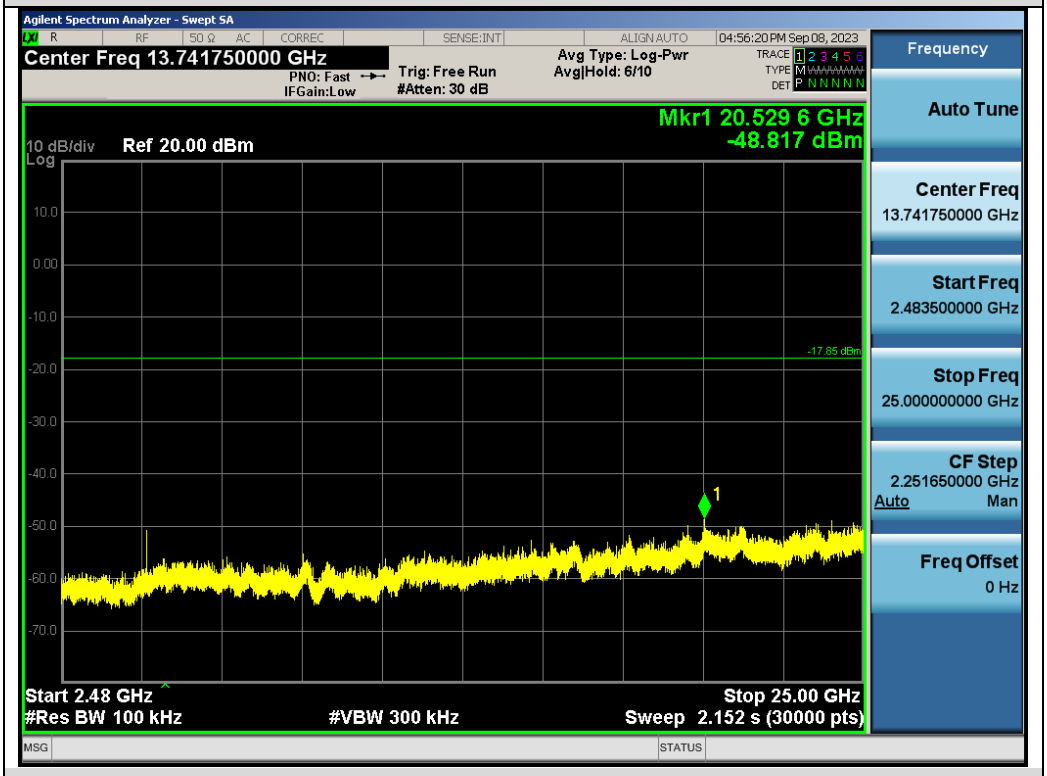
Test_Graph_802.11b_ANT1_2412_1Mbps_Lower Band Emissions



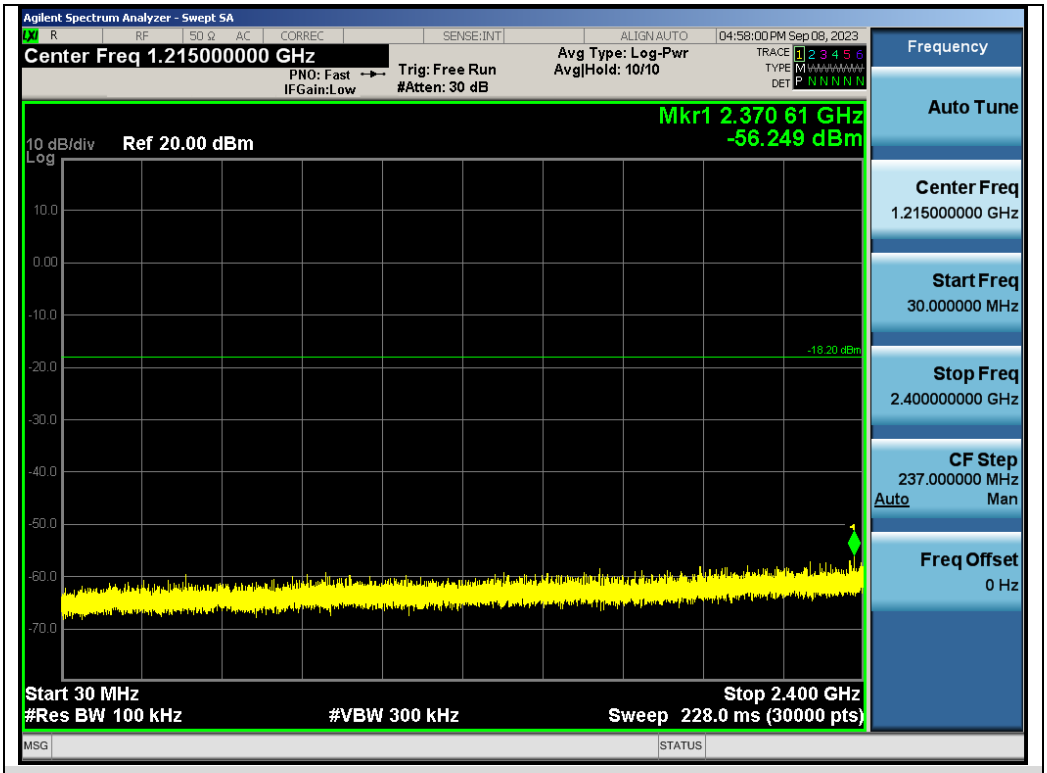
Test_Graph_802.11b_ANT1_2412_1Mbps_Higher Band Emissions



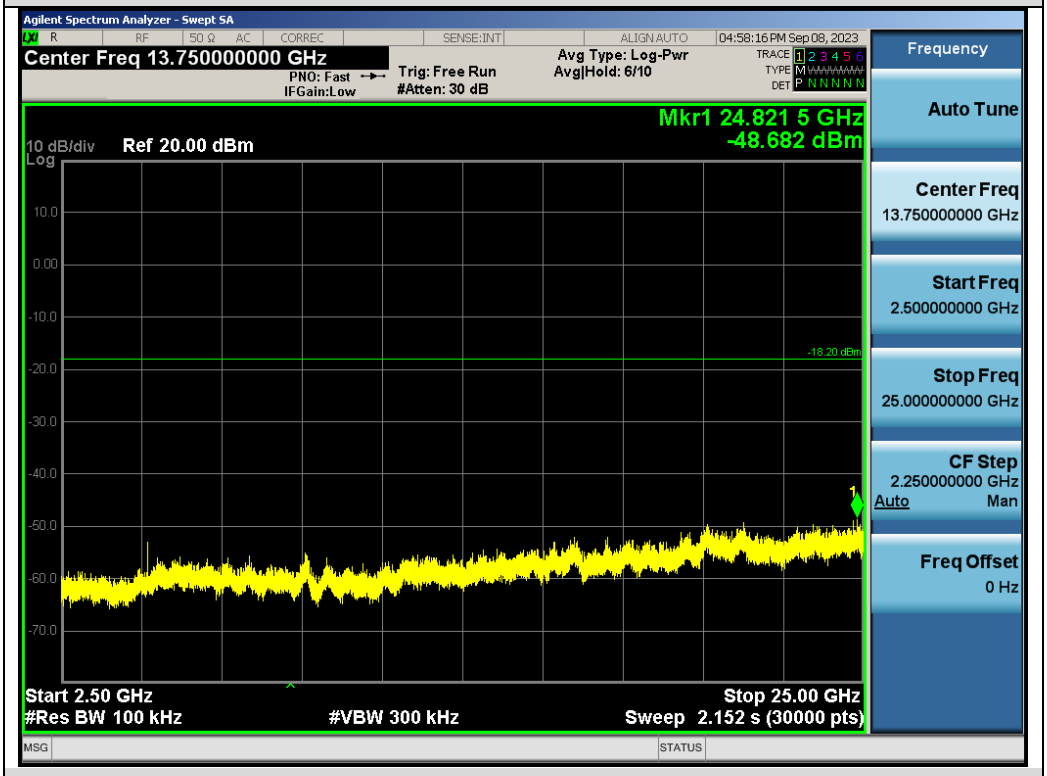
Test_Graph_802.11b_ANT1_2437_1Mbps_Lower Band Emissions



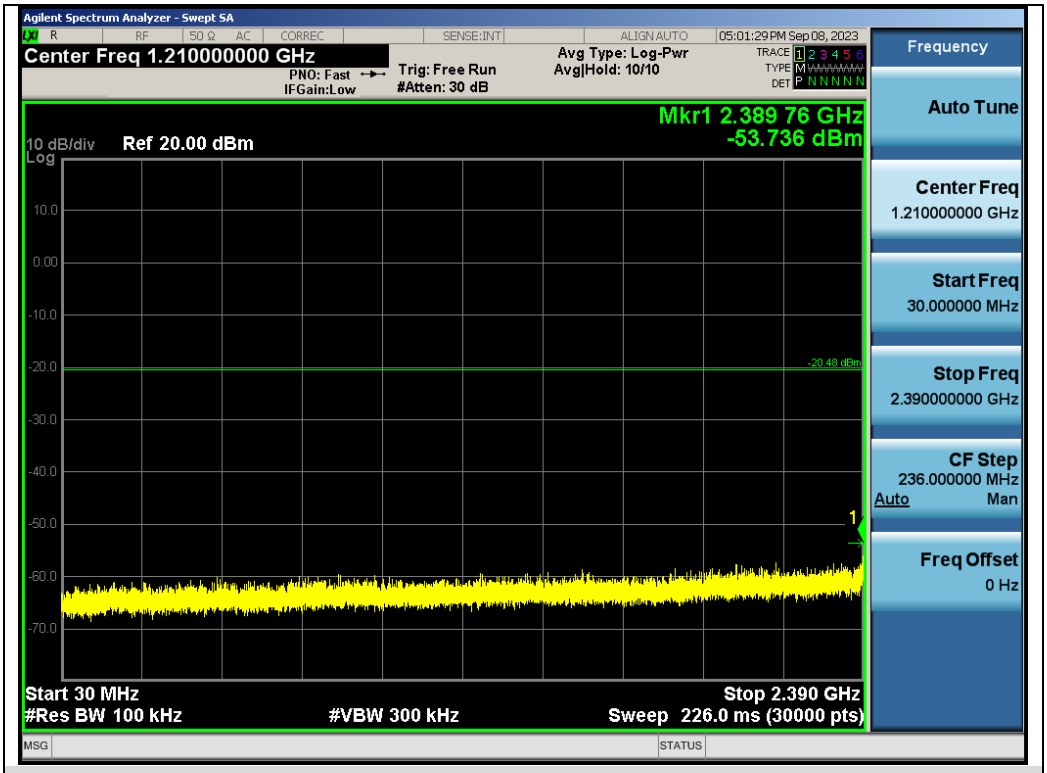
Test_Graph_802.11b_ANT1_2437_1Mbps_Higher Band Emissions



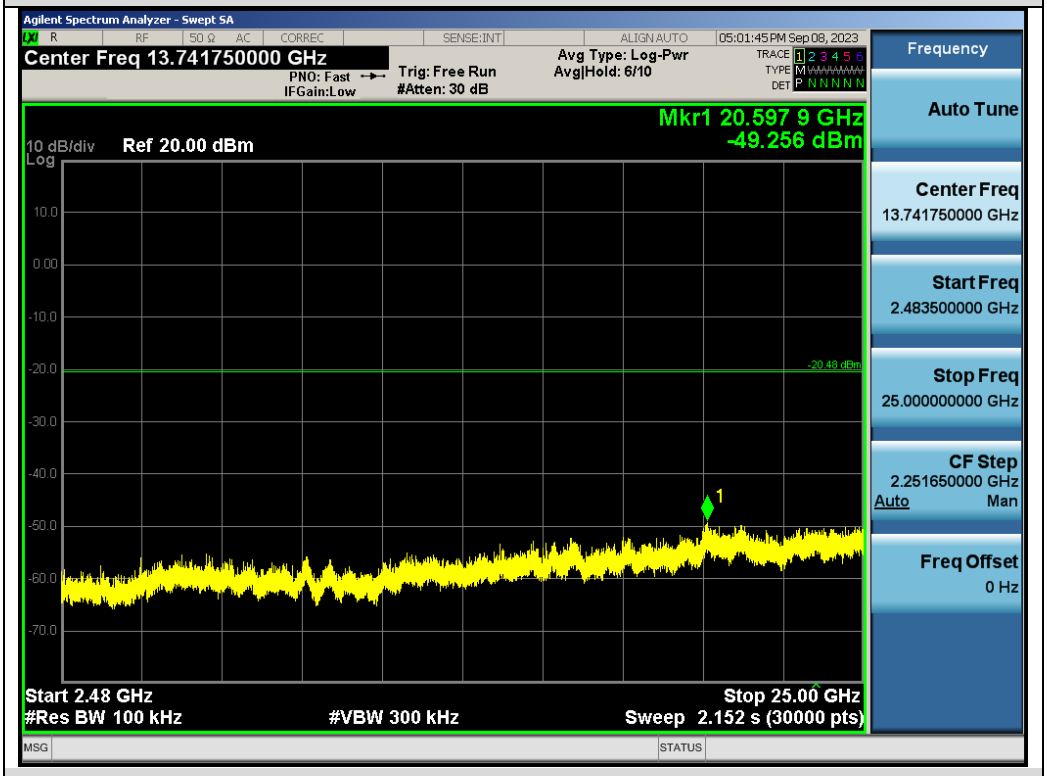
Test_Graph_802.11b_ANT1_2462_1Mbps_Lower Band Emissions



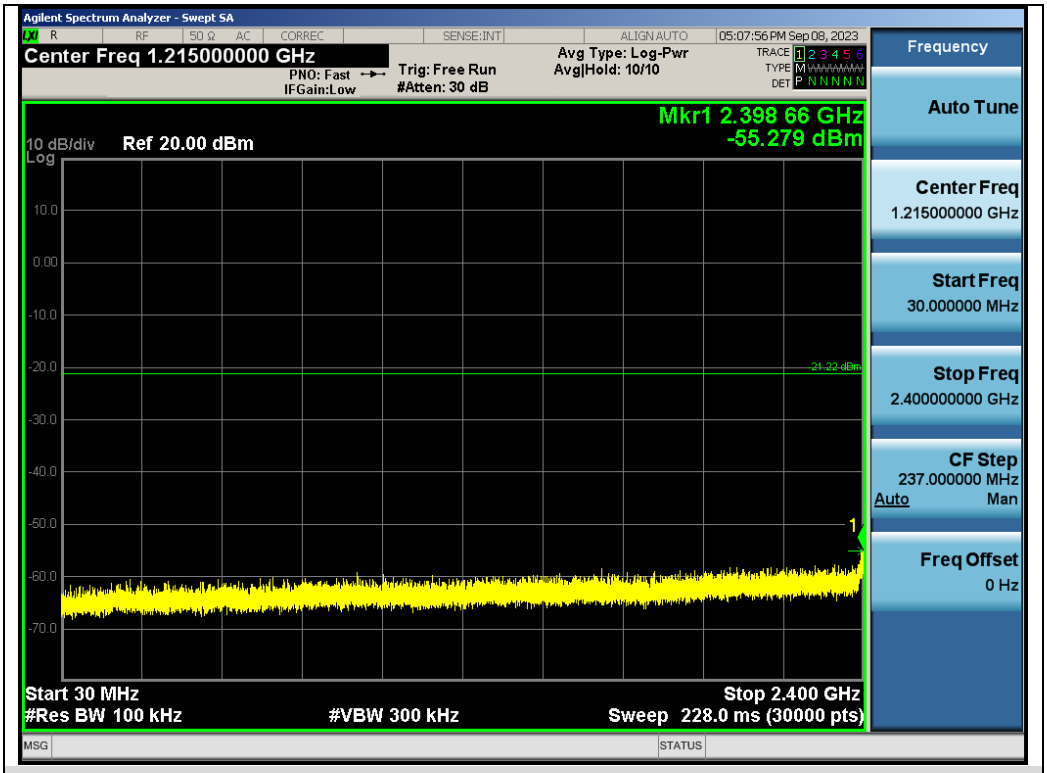
Test_Graph_802.11b_ANT1_2462_1Mbps_Higher Band Emissions



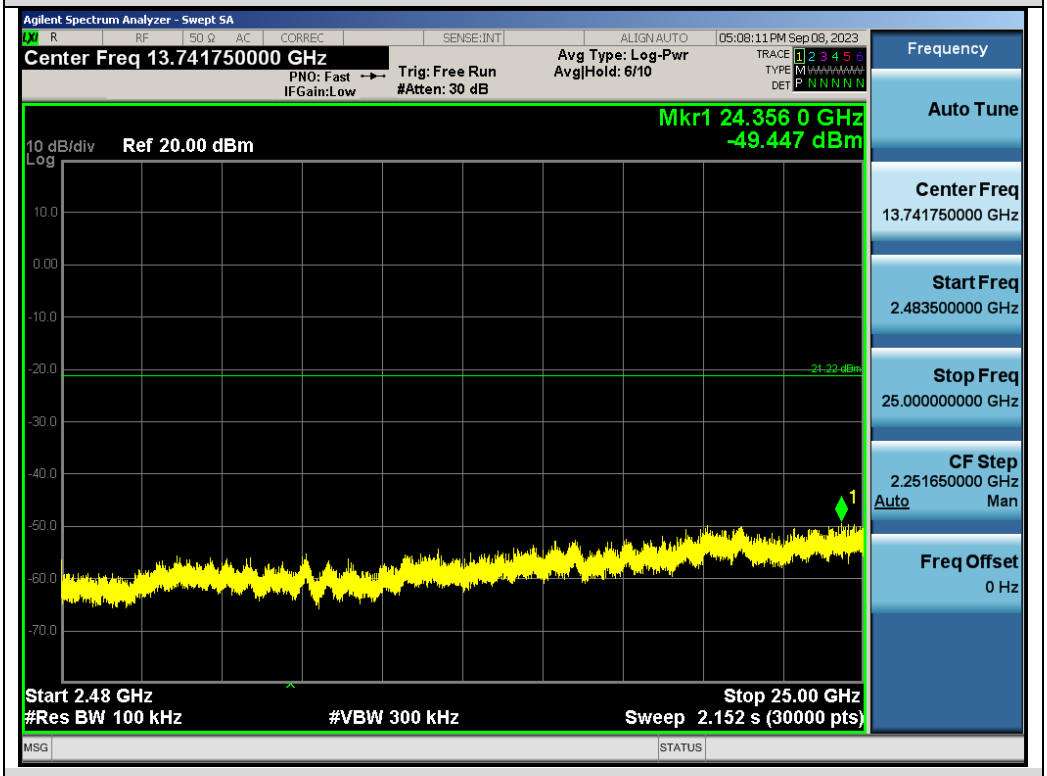
Test_Graph_802.11g_ANT1_2412_6Mbps_Lower Band Emissions



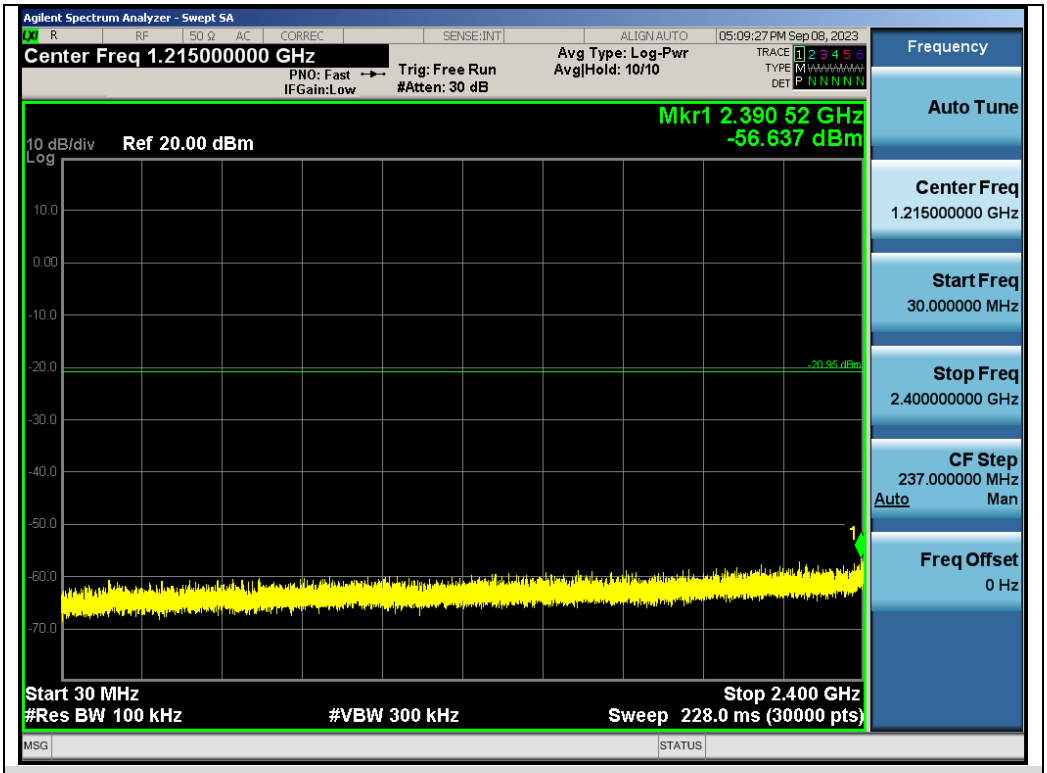
Test_Graph_802.11g_ANT1_2412_6Mbps_Higher Band Emissions



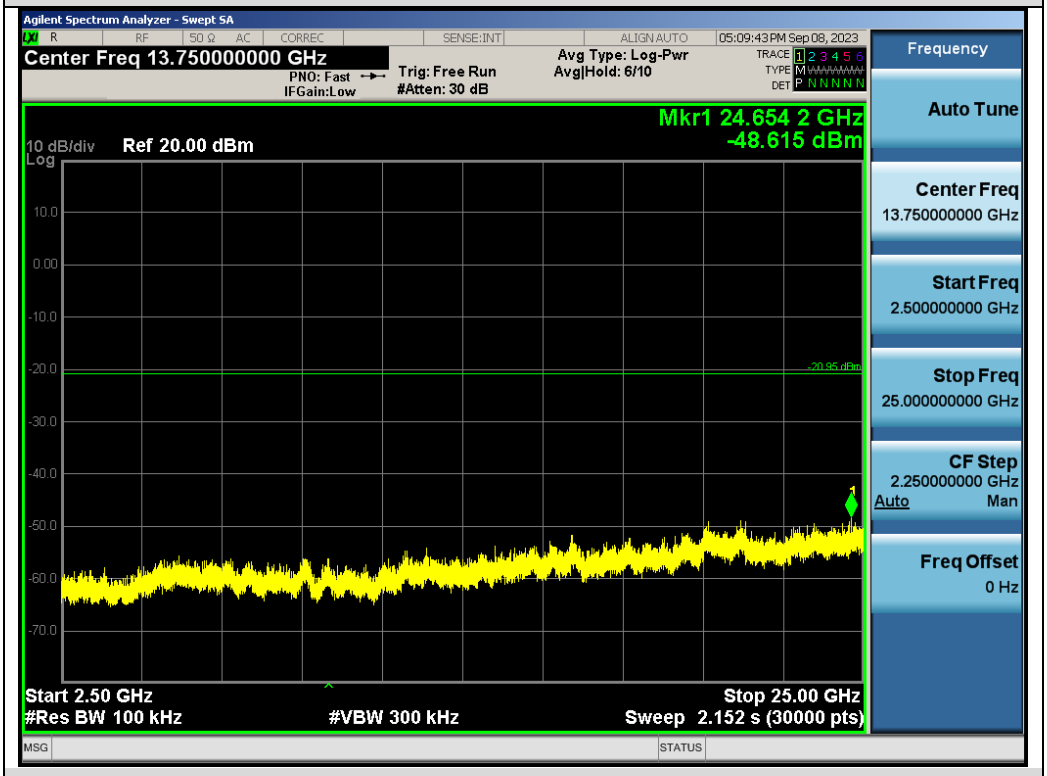
Test_Graph_802.11g_ANT1_2437_6Mbps_Lower Band Emissions



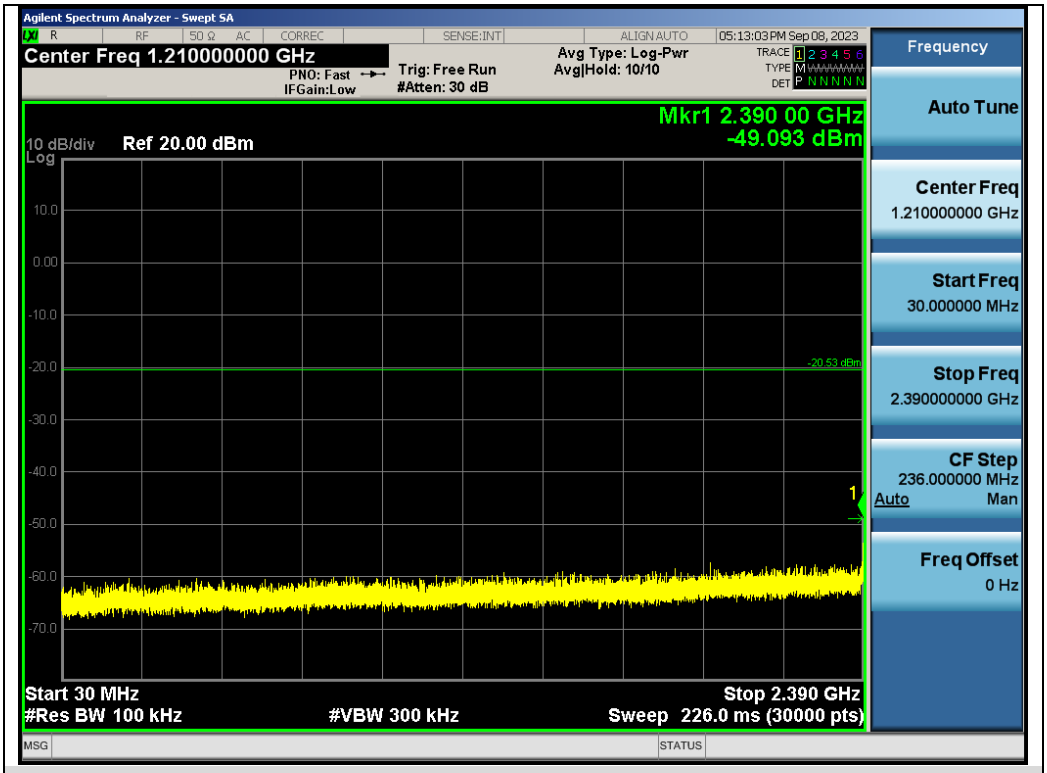
Test_Graph_802.11g_ANT1_2437_6Mbps_Higher Band Emissions



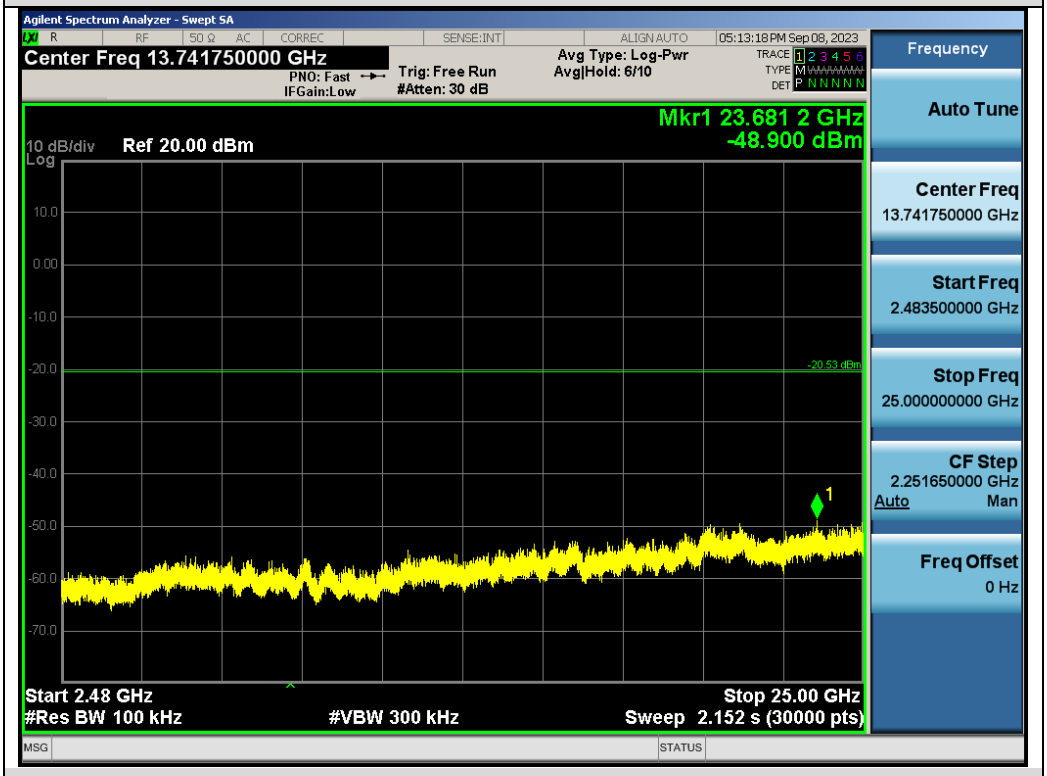
Test_Graph_802.11g_ANT1_2462_6Mbps_Lower Band Emissions



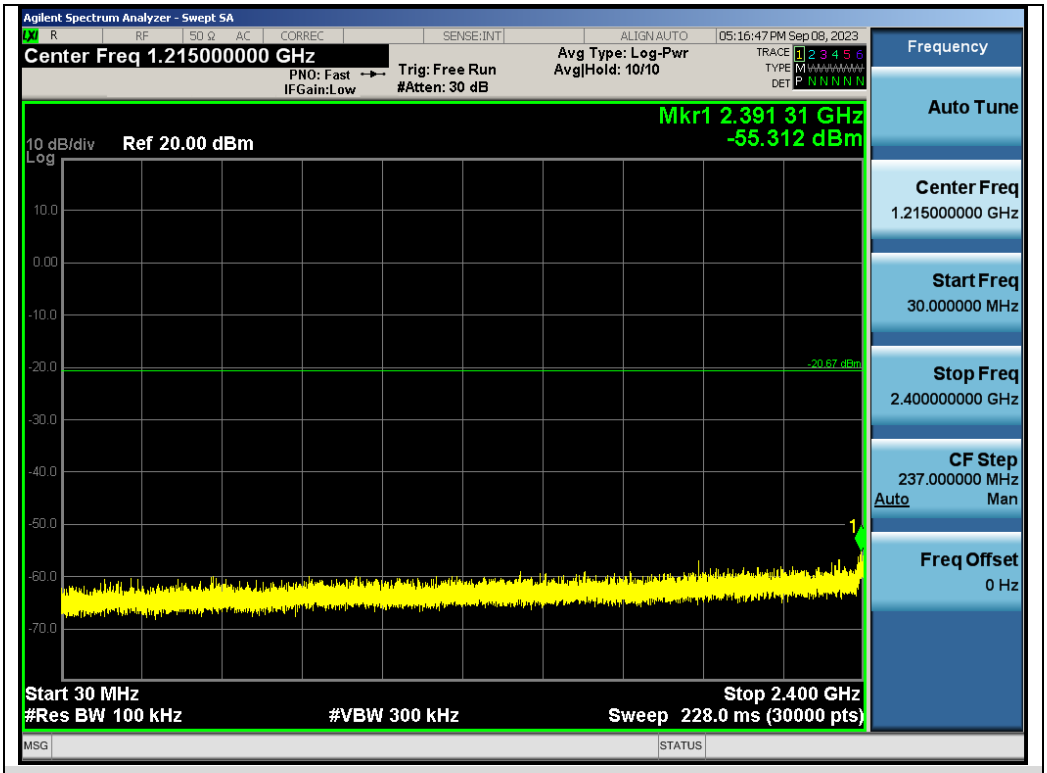
Test_Graph_802.11g_ANT1_2462_6Mbps_Higher Band Emissions



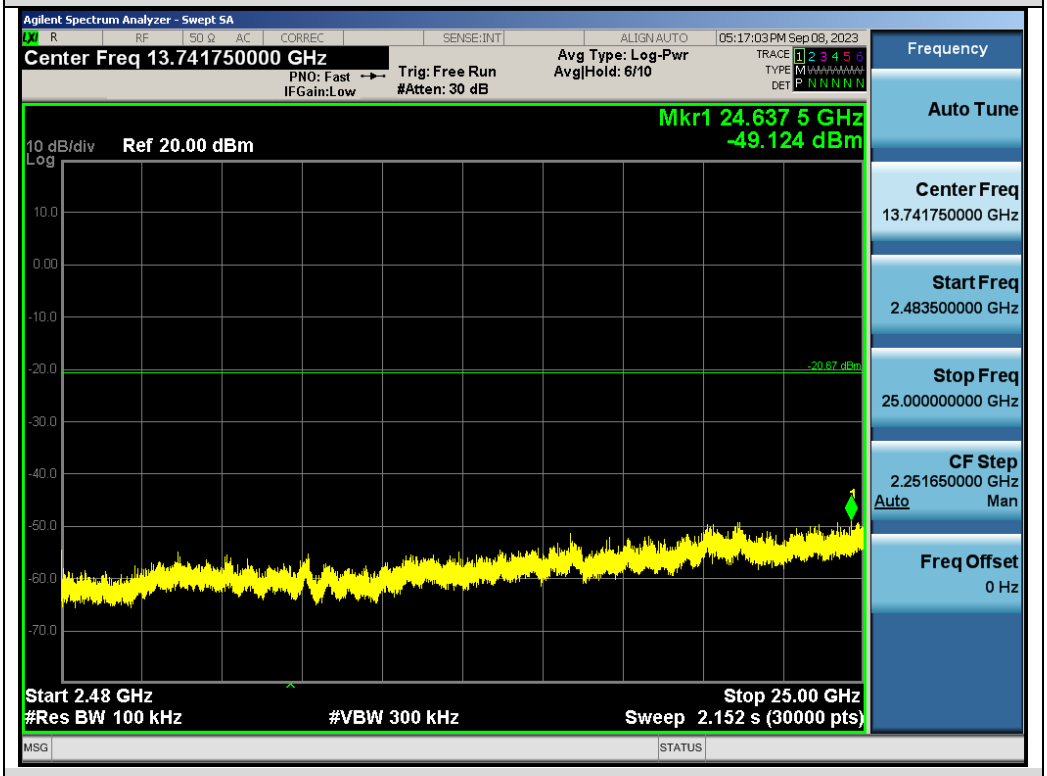
Test_Graph_802.11n20_ANT1_2412_MCS0_Lower Band Emissions



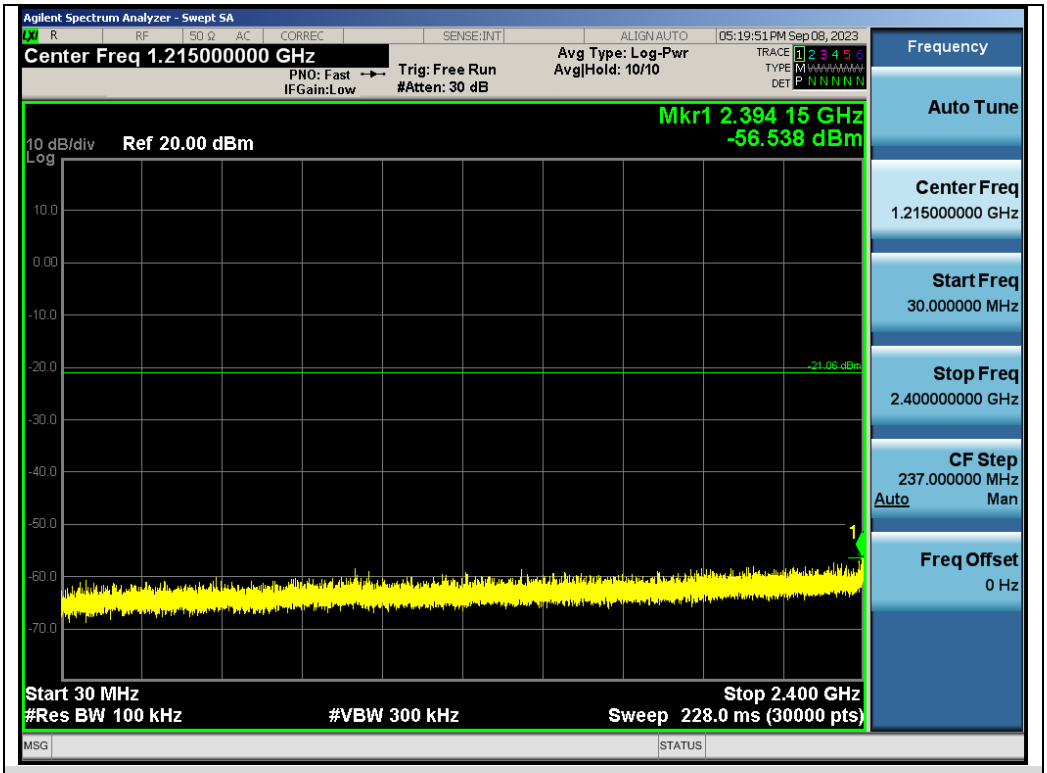
Test_Graph_802.11n20_ANT1_2412_MCS0_Higher Band Emissions



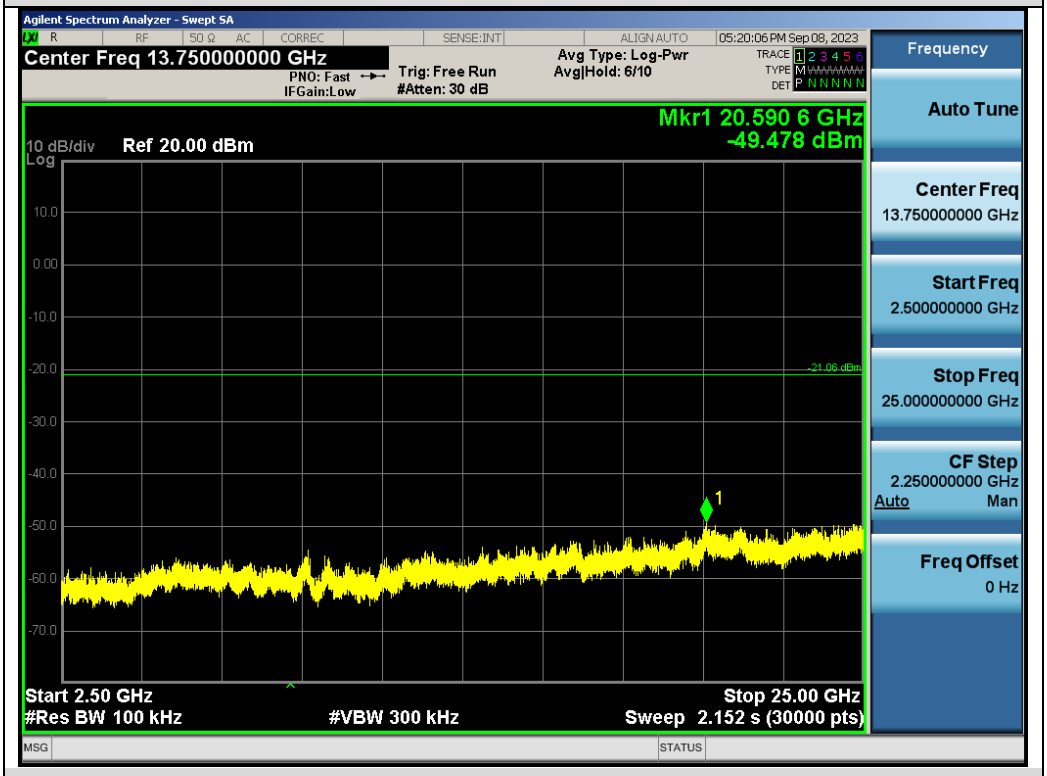
Test_Graph_802.11n20_ANT1_2437_MCS0_Lower Band Emissions



Test_Graph_802.11n20_ANT1_2437_MCS0_Higher Band Emissions

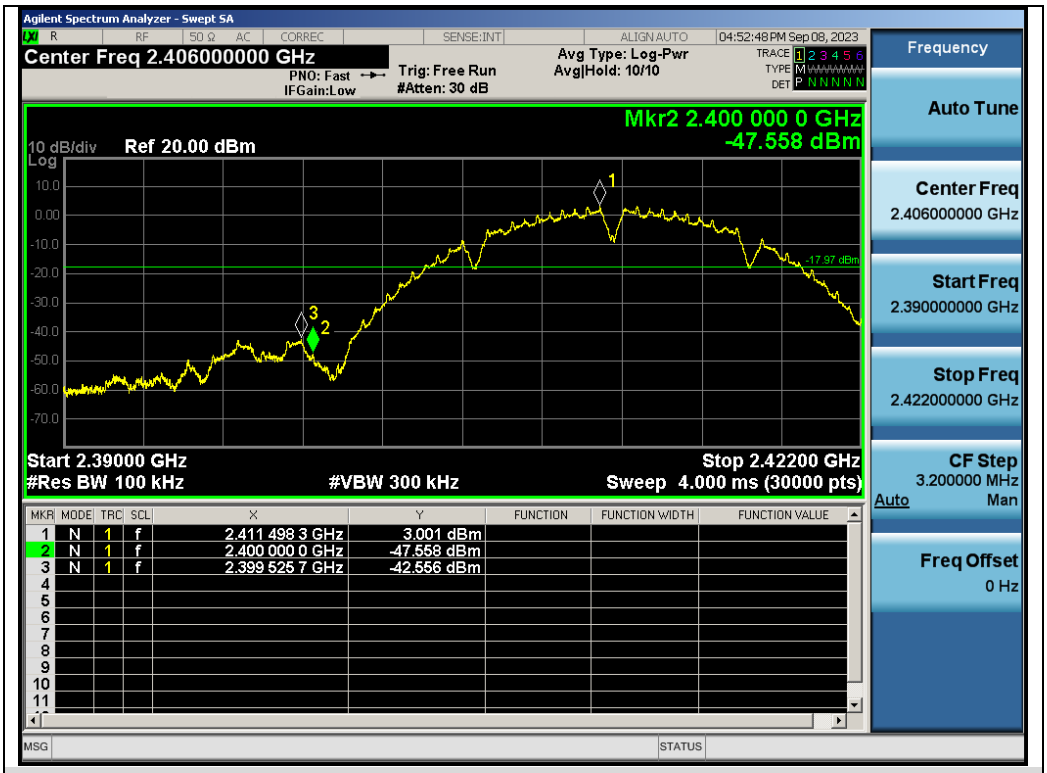


Test_Graph_802.11n20_ANT1_2462_MCS0_Lower Band Emissions

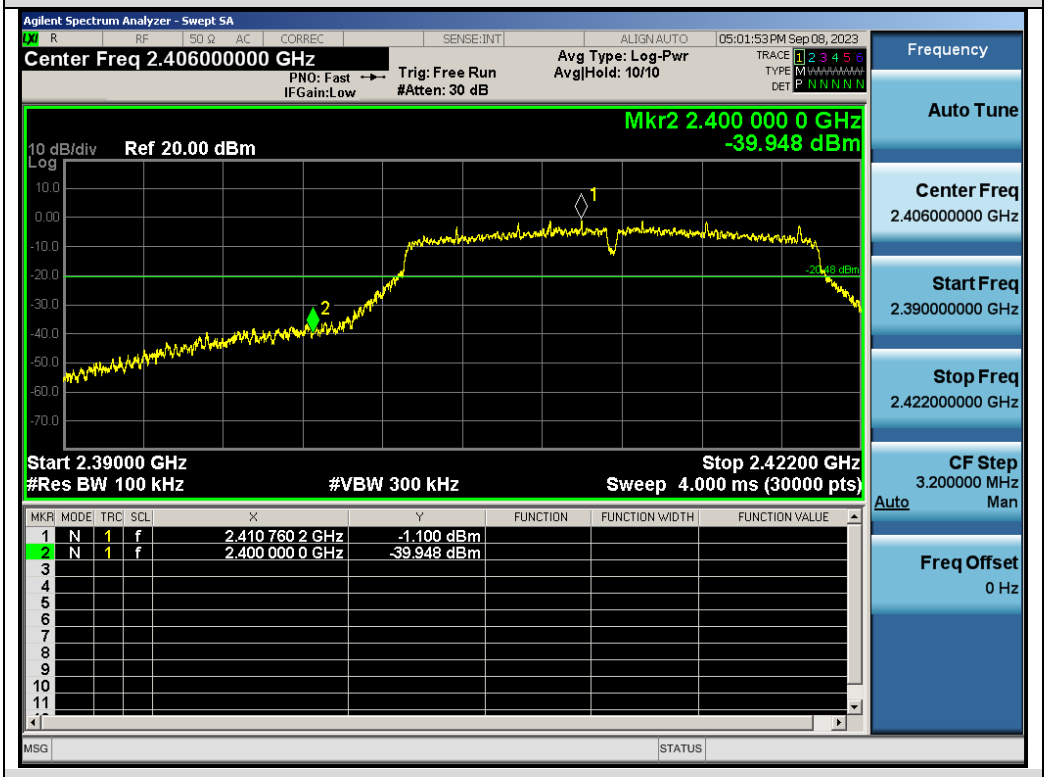


Test_Graph_802.11n20_ANT1_2462_MCS0_Higher Band Emissions

Test Graphs of Band Edge Emissions in Non-Restricted Frequency Bands



Test_Graph_802.11b_ANT1_2412_1Mbps_Lower Band Edge Emissions



Test_Graph_802.11g_ANT1_2412_6Mbps_Lower Band Edge Emissions

Test_Graph_802.11n20_ANT1_2412_MCS0_Lower Band Edge Emissions

Note: Emissions from 2483.5-2500MHz which fall in the restricted bands had been considered with the radiated emission limits specified.

11. Radiated Spurious Emission

11.1 Measurement Limits

15.209(a) Limit in the below table has to be followed

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

Note: All modes were tested for restricted band radiated emission, the test records reported below are the worst result compared to other modes.

11.2 Measurement Procedure

1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable. When the EUT is floor-standing equipment, it is placed on the ground plane which has a 10cm non-conductive covering to insulate the EUT from the ground plane.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emission, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz RBW and 3MHz VBW for peak reading. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds.

As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.

8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.

◆ The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP
Start ~Stop Frequency	1GHz~26.5GHz 1MHz/3MHz for Peak, 1MHz/3MHz for Average

Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP

- **Quasi-Peak Measurements below 1GHz**

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. Span was set greater than 1MHz
3. RBW = as shown in the table above
4. Detector = CISPR quasi-peak
5. Sweep time = auto couple
6. Trace was allowed to stabilize

- **Peak Measurements above 1GHz**

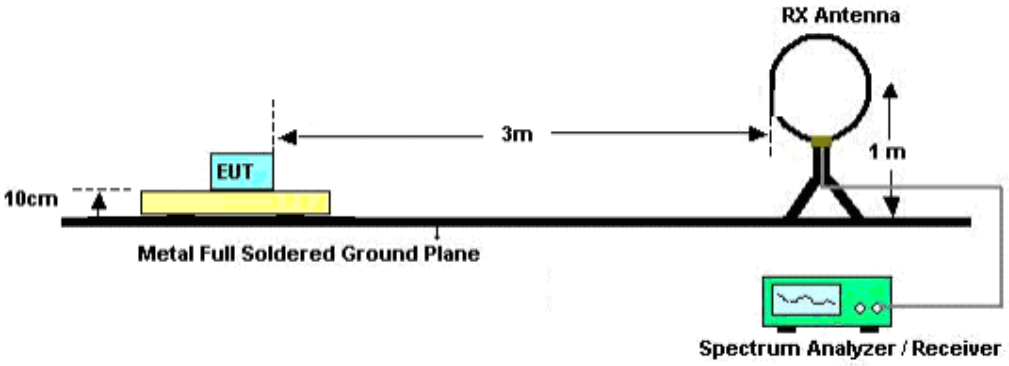
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

- **Average Measurements above 1GHz (Method VB)**

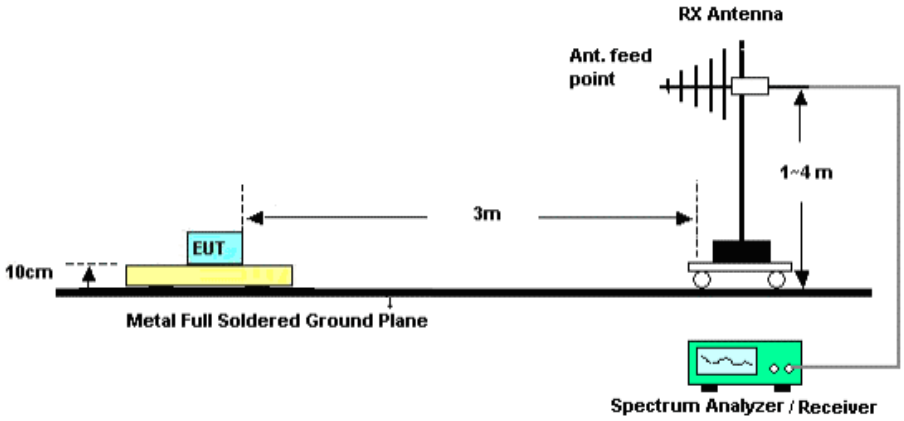
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW setting requirements are as follows:
4. If the EUT is configured to transmit with duty cycle ≥ 98%, set VBW = 10 Hz.
5. If the EUT duty cycle is < 98%, set VBW ≥ 1/T. T is the minimum transmission duration.
6. Detector = Peak
7. Sweep time = auto
8. Trace mode = max hold

11.3 Measurement Setup (Block Diagram of Configuration)

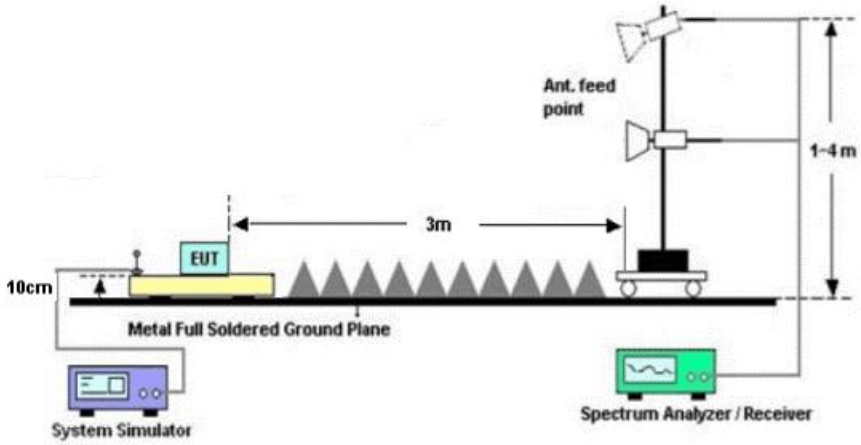
Radiated Emission Test Setup 9kHz-30MHz



Radiated Emission Test Setup 30MHz-1000MHz



Radiated Emission Test Setup Above 1000MHz

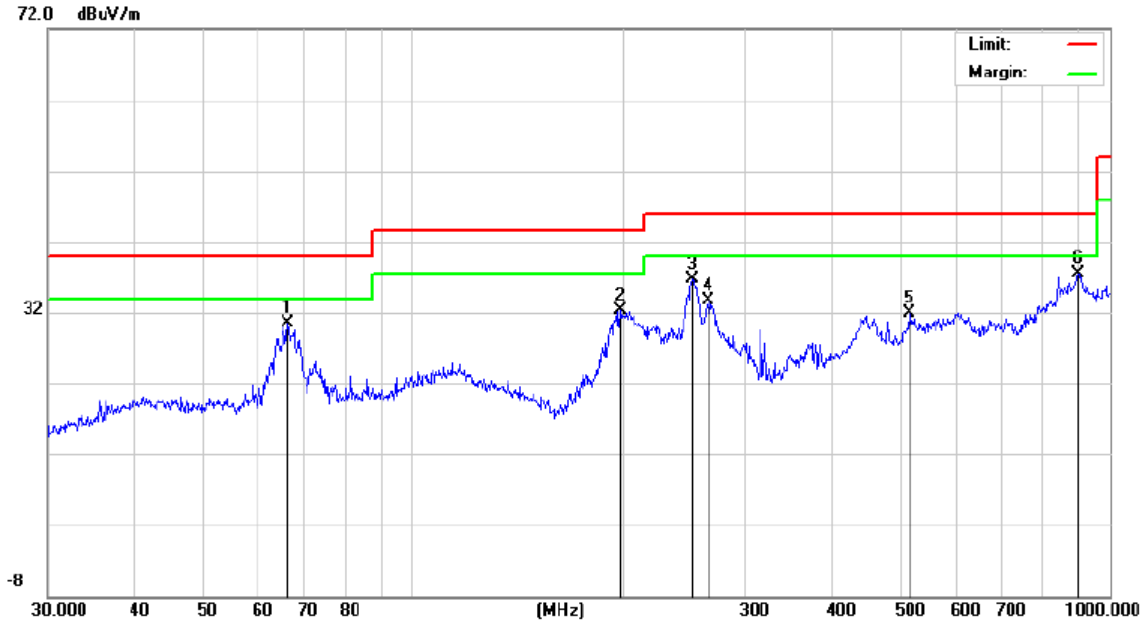


11.4 Measurement Result

Radiated Emission Below 30MHz

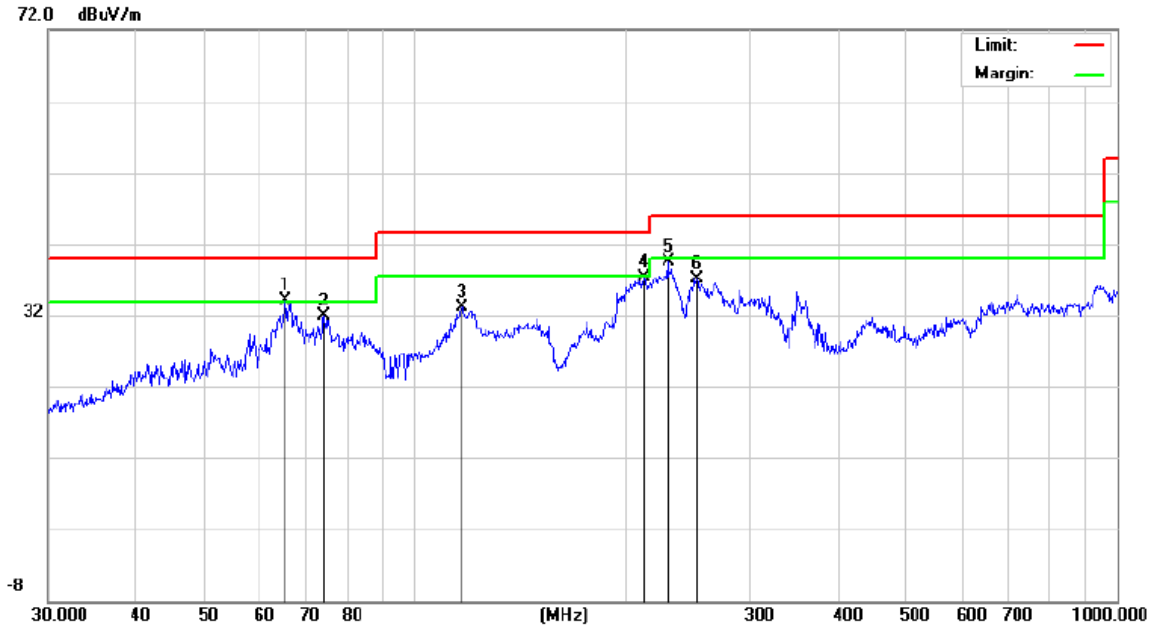
The amplitude of spurious emissions from 9kHz to 30MHz which are attenuated more than 20 dB below the permissible value need not be reported.

Radiated Emission Test Results at 30MHz-1GHz			
EUT Name	Smart Space Heater	**Model Name**	NB-HE002
Temperature	22.5°C	**Relative Humidity**	57.6%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	Mode 2	**Polarity:**	Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		66.2661	17.73	12.69	30.42	40.00	-9.58	peak
2		198.5879	18.00	14.34	32.34	43.50	-11.16	peak
3		252.0627	21.73	15.04	36.77	46.00	-9.23	peak
4		265.6757	18.90	14.83	33.73	46.00	-12.27	peak
5		515.4374	7.45	24.49	31.94	46.00	-14.06	peak
6	*	900.1473	5.76	31.78	37.54	46.00	-8.46	peak

Radiated Emission Test Results at 30MHz-1GHz			
EUT Name	Smart Space Heater	**Model Name**	NB-HE002
Temperature	22.5°C	**Relative Humidity**	57.6%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	Mode 2	Polarity:	Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1	*	65.3431	17.06	17.05	34.11	40.00	-5.89	peak
2		74.1350	14.98	16.96	31.94	40.00	-8.06	peak
3		116.5400	16.09	17.09	33.18	43.50	-10.32	peak
4		212.2693	20.27	16.98	37.25	43.50	-6.25	peak
5		229.2931	23.16	16.32	39.48	46.00	-6.52	peak
6		252.0627	19.96	17.24	37.20	46.00	-8.80	peak

RESULT: Pass

Note: 1. Factor=Antenna Factor + Cable loss, Over=Measurement-Limit.

2. All test modes had been pre-tested. The mode 2 is the worst case and recorded in the report.

Radiated Emissions Test Results above 1 GHz

EUT Name	Smart Space Heater	**Model Name**	NB-HE002
Temperature	22.5°C	**Relative Humidity**	57.6%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	Mode 1	**Antenna Polarity**	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4804.000	46.86	0.08	46.94	74	-27.06	peak
4804.000	37.45	0.08	37.53	54	-16.47	AVG
7206.000	41.29	2.21	43.5	74	-30.5	peak
7206.000	32.37	2.21	34.58	54	-19.42	AVG

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT Name	Smart Space Heater	**Model Name**	NB-HE002
Temperature	22.5°C	**Relative Humidity**	57.6%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	Mode 1	**Antenna Polarity**	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4804.000	46.41	0.08	46.49	74	-27.51	peak
4804.000	37.73	0.08	37.81	54	-16.19	AVG
7206.000	41.59	2.21	43.8	74	-30.2	peak
7206.000	32.68	2.21	34.89	54	-19.11	AVG

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

RESULT: Pass

Radiated Emissions Test Results above 1GHz

EUT Name	Smart Space Heater	**Model Name**	NB-HE002
Temperature	22.5°C	**Relative Humidity**	57.6%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	Mode 2	**Antenna Polarity**	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4882.000	45.42	0.14	45.56	74	-28.44	peak
4882.000	36.85	0.14	36.99	54	-17.01	AVG
7323.000	40.82	2.36	43.18	74	-30.82	peak
7323.000	32.51	2.36	34.87	54	-19.13	AVG

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT Name	Smart Space Heater	**Model Name**	NB-HE002
Temperature	22.5°C	**Relative Humidity**	57.6%
Pressure	960hPa	**Test Voltage**	**Normal Voltage**
Test Mode	Mode 2	**Antenna Polarity**	**Vertical**

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4882.000	45.69	0.14	45.83	74	-28.17	peak
4882.000	36.41	0.14	36.55	54	-17.45	AVG
7323.000	40.78	2.36	43.14	74	-30.86	peak
7323.000	32.56	2.36	34.92	54	-19.08	AVG

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

RESULT: Pass

Radiated Emissions Test Results above 1GHz

EUT Name	Smart Space Heater	**Model Name**	NB-HE002
Temperature	22.5°C	**Relative Humidity**	57.6%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	Mode 3	**Antenna Polarity**	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4960.000	46.66	0.22	46.88	74	-27.12	peak
4960.000	34.41	0.22	34.63	54	-19.37	AVG
7440.000	41.29	2.64	43.93	74	-30.07	peak
7440.000	33.47	2.64	36.11	54	-17.89	AVG

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT Name	Smart Space Heater	**Model Name**	NB-HE002
Temperature	22.5°C	**Relative Humidity**	57.6%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	Mode 3	**Antenna Polarity**	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4960.000	46.74	0.22	46.96	74	-27.04	peak
4960.000	34.59	0.22	34.81	54	-19.19	AVG
7440.000	41.63	2.64	44.27	74	-29.73	peak
7440.000	33.85	2.64	36.49	54	-17.51	AVG

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

RESULT: Pass

Radiated Emissions Test Results above 1GHz

EUT Name	Smart Space Heater	**Model Name**	NB-HE002
Temperature	22.5°C	**Relative Humidity**	57.6%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	Mode 4	**Antenna Polarity**	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4804.000	46.63	0.08	46.71	74	-27.29	peak
4804.000	37.52	0.08	37.6	54	-16.4	AVG
7206.000	41.48	2.21	43.69	74	-30.31	peak
7206.000	32.33	2.21	34.54	54	-19.46	AVG

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT Name	Smart Space Heater	**Model Name**	NB-HE002
Temperature	22.5°C	**Relative Humidity**	57.6%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	Mode 4	**Antenna Polarity**	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4804.000	46.47	0.08	46.55	74	-27.45	peak
4804.000	37.85	0.08	37.93	54	-16.07	AVG
7206.000	41.43	2.21	43.64	74	-30.36	peak
7206.000	32.69	2.21	34.9	54	-19.1	AVG

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

RESULT: Pass

Radiated Emissions Test Results above 1GHz

EUT Name	Smart Space Heater	**Model Name**	NB-HE002
Temperature	22.5°C	**Relative Humidity**	57.6%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	Mode 5	**Antenna Polarity**	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4882.000	45.85	0.14	45.99	74	-28.01	peak
4882.000	38.41	0.14	38.55	54	-15.45	AVG
7323.000	41.29	2.36	43.65	74	-30.35	peak
7323.000	34.33	2.36	36.69	54	-17.31	AVG

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT Name	Smart Space Heater	**Model Name**	NB-HE002
Temperature	22.5°C	**Relative Humidity**	57.6%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	Mode 5	**Antenna Polarity**	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4882.000	45.52	0.14	45.66	74	-28.34	peak
4882.000	37.74	0.14	37.88	54	-16.12	AVG
7323.000	40.49	2.36	42.85	74	-31.15	peak
7323.000	33.62	2.36	35.98	54	-18.02	AVG

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

RESULT: Pass

Radiated Emissions Test Results above 1GHz

EUT Name	Smart Space Heater	**Model Name**	NB-HE002
Temperature	22.5°C	**Relative Humidity**	57.6%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	Mode 6	**Antenna Polarity**	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4960.000	46.33	0.22	46.55	74	-27.45	peak
4960.000	38.22	0.22	38.44	54	-15.56	AVG
7440.000	41.85	2.64	44.49	74	-29.51	peak
7440.000	32.41	2.64	35.05	54	-18.95	AVG

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT Name	Smart Space Heater	**Model Name**	NB-HE002
Temperature	22.5°C	**Relative Humidity**	57.6%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	Mode 6	**Antenna Polarity**	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4960.000	46.25	0.22	46.47	74	-27.53	peak
4960.000	38.48	0.22	38.7	54	-15.3	AVG
7440.000	40.51	2.64	43.15	74	-30.85	peak
7440.000	31.65	2.64	34.29	54	-19.71	AVG

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

RESULT: Pass

Radiated Emissions Test Results above 1GHz

EUT Name	Smart Space Heater	Model Name	NB-HE002
Temperature	22.5°C	Relative Humidity	57.6%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 7	Antenna Polarity	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4804.000	45.74	0.08	45.82	74	-28.18	peak
4804.000	36.32	0.08	36.4	54	-17.6	AVG
7206.000	41.52	2.21	43.73	74	-30.27	peak
7206.000	32.48	2.21	34.69	54	-19.31	AVG

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT Name	Smart Space Heater	Model Name	NB-HE002
Temperature	22.5°C	Relative Humidity	57.6%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 7	Antenna Polarity	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4804.000	45.89	0.08	45.97	74	-28.03	peak
4804.000	36.63	0.08	36.71	54	-17.29	AVG
7206.000	41.45	2.21	43.66	74	-30.34	peak
7206.000	32.33	2.21	34.54	54	-19.46	AVG

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

RESULT: Pass

Radiated Emissions Test Results above 1GHz

EUT Name	Smart Space Heater	**Model Name**	NB-HE002
Temperature	22.5°C	**Relative Humidity**	57.6%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	Mode 8	**Antenna Polarity**	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4882.000	45.41	0.14	45.55	74	-28.45	peak
4882.000	37.84	0.14	37.98	54	-16.02	AVG
7323.000	41.56	2.36	43.92	74	-30.08	peak
7323.000	34.49	2.36	36.85	54	-17.15	AVG

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT Name	Smart Space Heater	**Model Name**	NB-HE002
Temperature	22.5°C	**Relative Humidity**	57.6%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	Mode 8	**Antenna Polarity**	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4882.000	45.58	0.14	45.72	74	-28.28	peak
4882.000	37.63	0.14	37.77	54	-16.23	AVG
7323.000	41.41	2.36	43.77	74	-30.23	peak
7323.000	34.32	2.36	36.68	54	-17.32	AVG

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

RESULT: Pass

Radiated Emissions Test Results above 1GHz

EUT Name	Smart Space Heater	**Model Name**	NB-HE002
Temperature	22.5°C	**Relative Humidity**	57.6%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	Mode 9	**Antenna Polarity**	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4960.000	46.44	0.22	46.66	74	-27.34	peak
4960.000	36.92	0.22	37.14	54	-16.86	AVG
7440.000	41.54	2.64	44.18	74	-29.82	peak
7440.000	32.48	2.64	35.12	54	-18.88	AVG

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT Name	Smart Space Heater	**Model Name**	NB-HE002
Temperature	22.5°C	**Relative Humidity**	57.6%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	Mode 9	**Antenna Polarity**	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4960.000	46.63	0.22	46.85	74	-27.15	peak
4960.000	36.74	0.22	36.96	54	-17.04	AVG
7440.000	41.63	2.64	44.27	74	-29.73	peak
7440.000	32.82	2.64	35.46	54	-18.54	AVG

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

RESULT: Pass

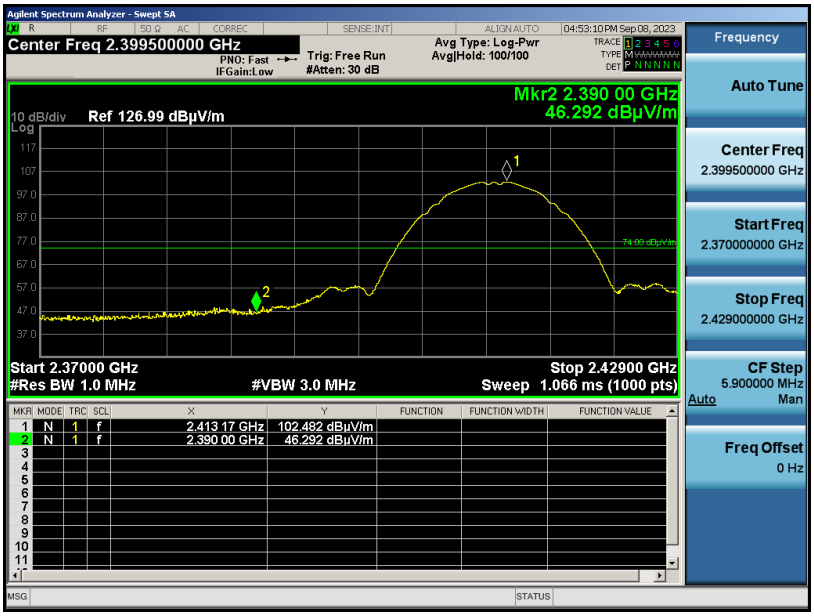
Note:

1. The amplitude of other spurious emissions from 1G to 25 GHz which are attenuated more than 20 dB below the permissible value need not be reported.
2. Factor = Antenna Factor + Cable loss – Pre-amplifier gain, Margin =Emission Level-Limit.
3. The “Factor” value can be calculated automatically by software of measurement system.

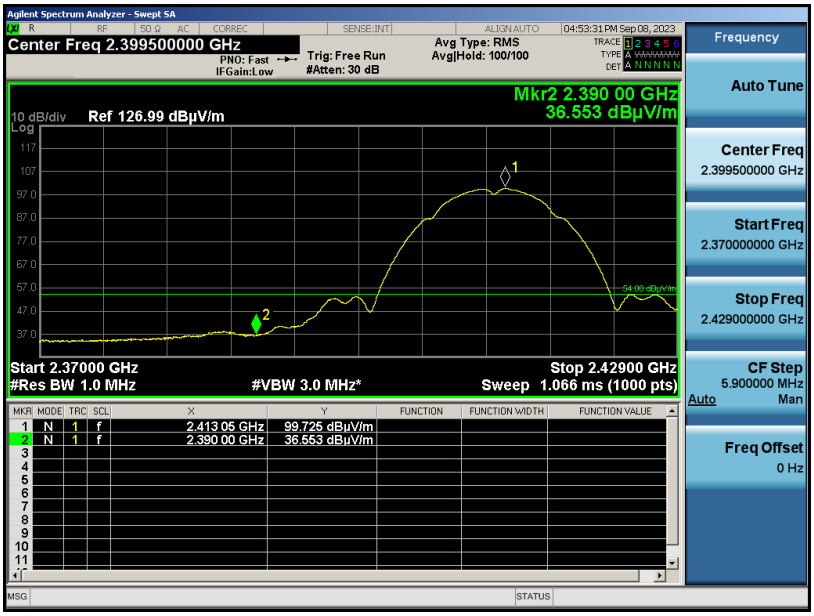
Band Edge Emission Test Results for Restricted Bands

EUT Name	Smart Space Heater	Model Name	NB-HE002
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna Polarity	Horizontal

Test Graph for Peak Measurement



Test Graph for Average Measurement

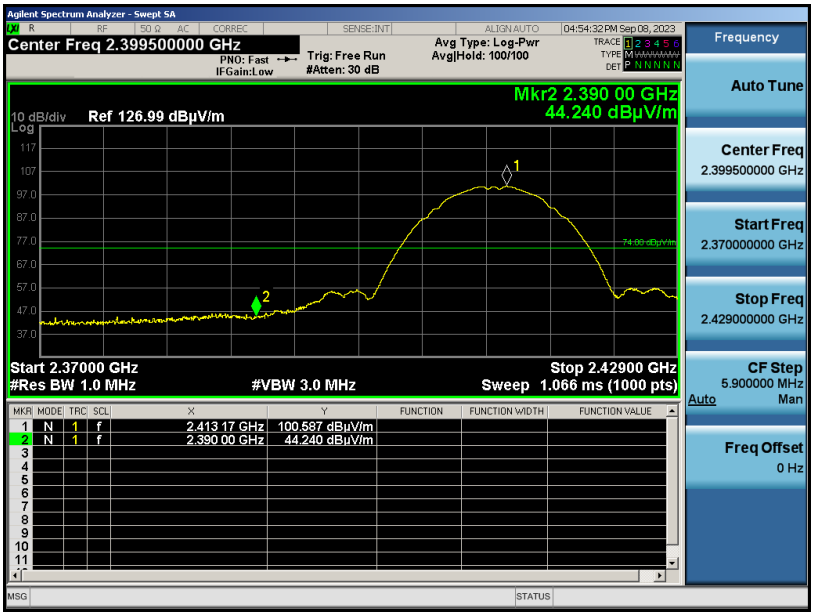


RESULT: Pass

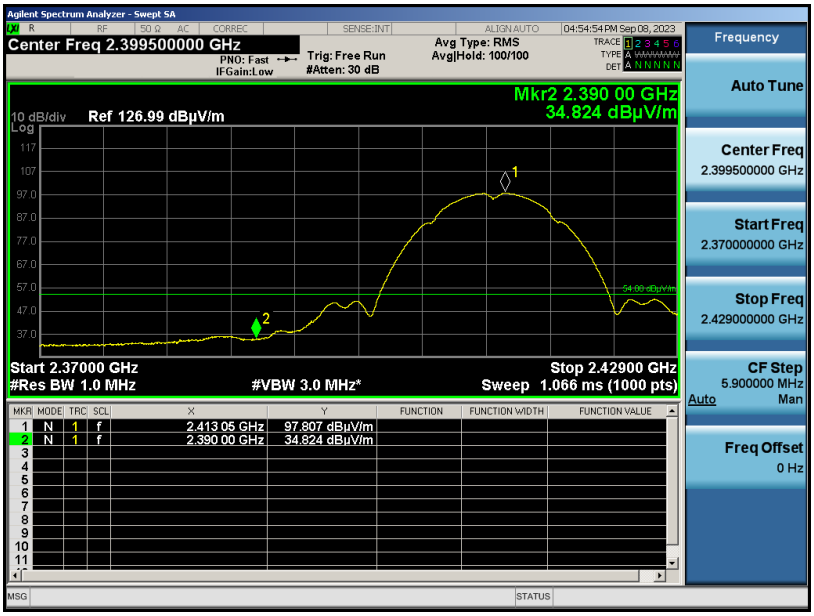
Band Edge Emission Test Results for Restricted Bands

EUT Name	Smart Space Heater	Model Name	NB-HE002
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna Polarity	Vertical

Test Graph for Peak Measurement



Test Graph for Average Measurement



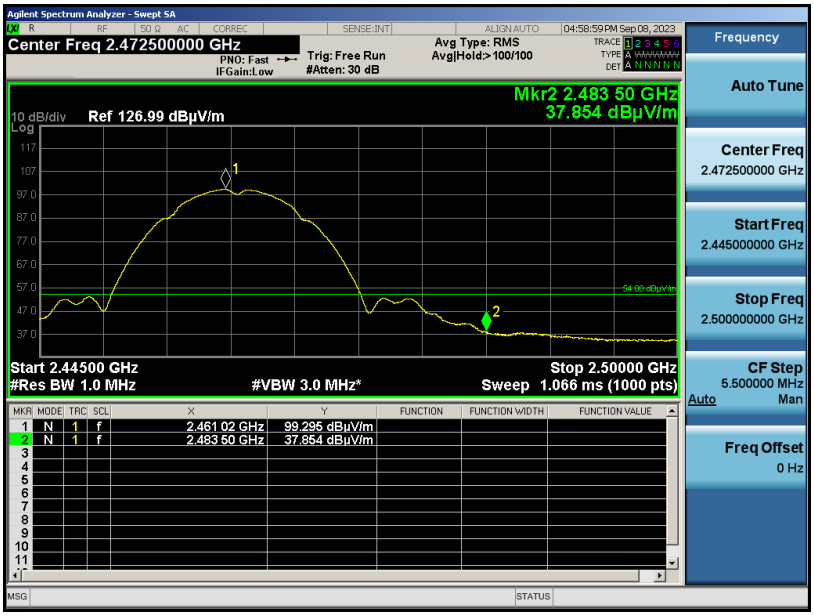
RESULT: Pass

Band Edge Emission Test Results for Restricted Bands

EUT Name	Smart Space Heater	Model Name	NB-HE002
Temperature	22.5°C	Relative Humidity	57.6%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna Polarity	Horizontal

Test Graph for Peak Measurement

Test Graph for Average Measurement

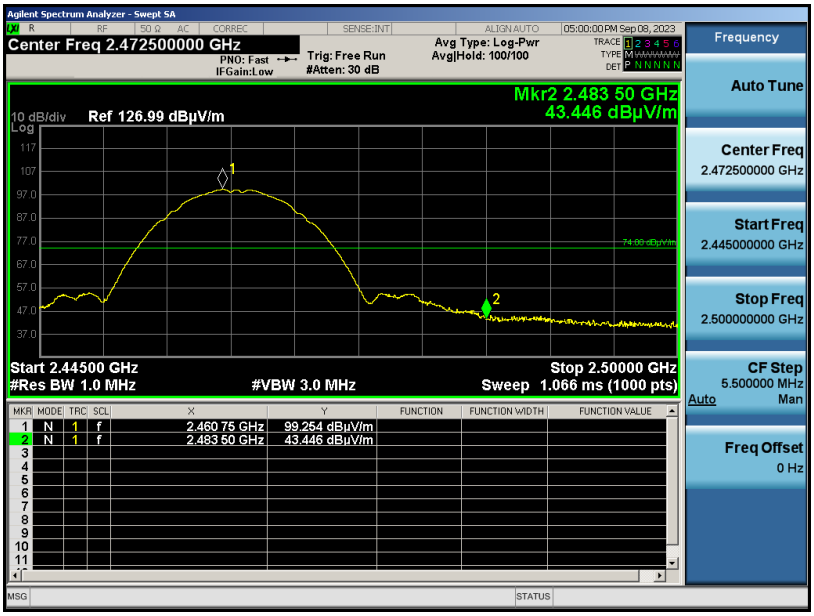


RESULT: Pass

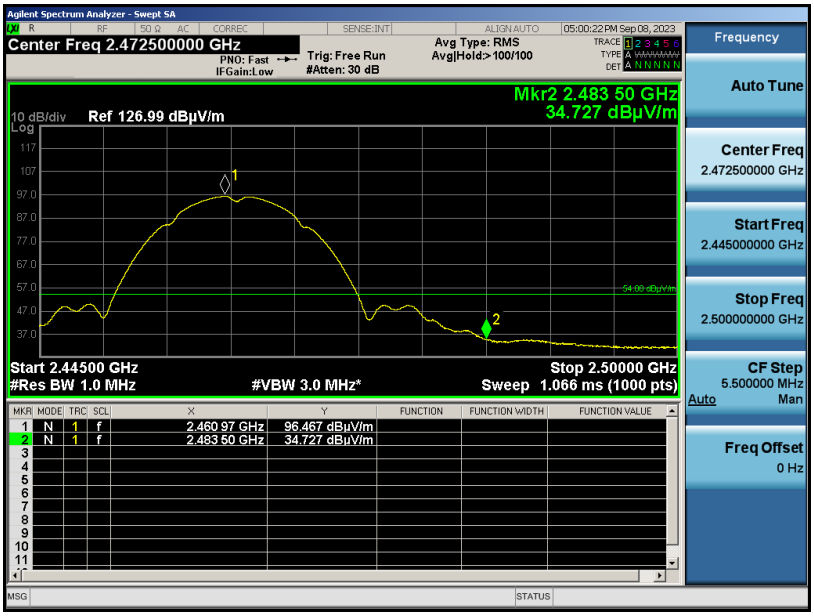
Band Edge Emission Test Results for Restricted Bands

EUT Name	Smart Space Heater	Model Name	NB-HE002
Temperature	22.5°C	Relative Humidity	57.6%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna Polarity	Vertical

Test Graph for Peak Measurement



Test Graph for Average Measurement

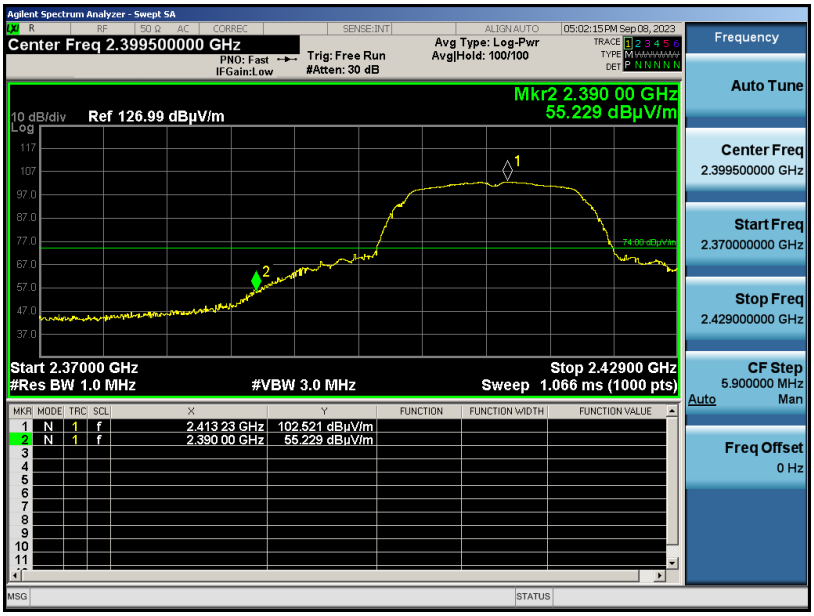


RESULT: Pass

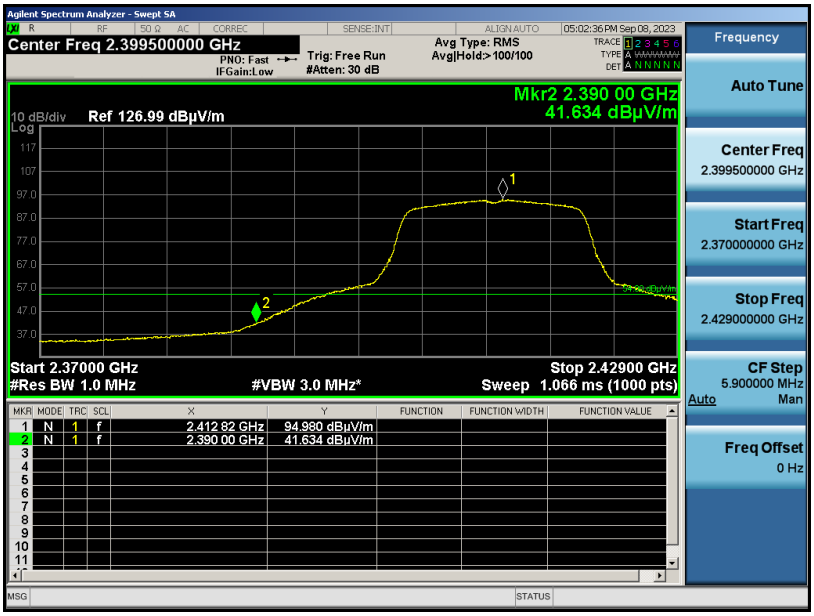
Band Edge Emission Test Results for Restricted Bands

EUT Name	Smart Space Heater	Model Name	NB-HE002
Temperature	22.5°C	Relative Humidity	57.6%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 4	Antenna Polarity	Horizontal

Test Graph for Peak Measurement



Test Graph for Average Measurement

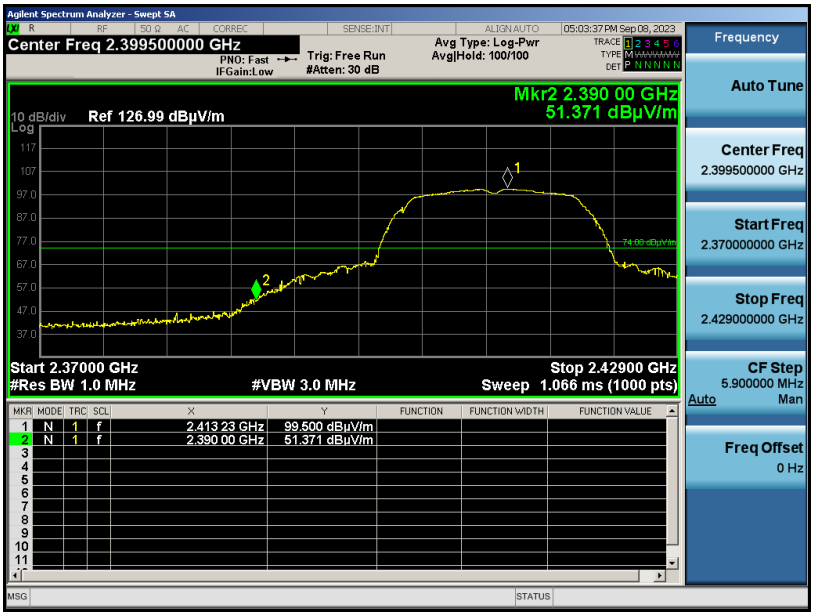


RESULT: Pass

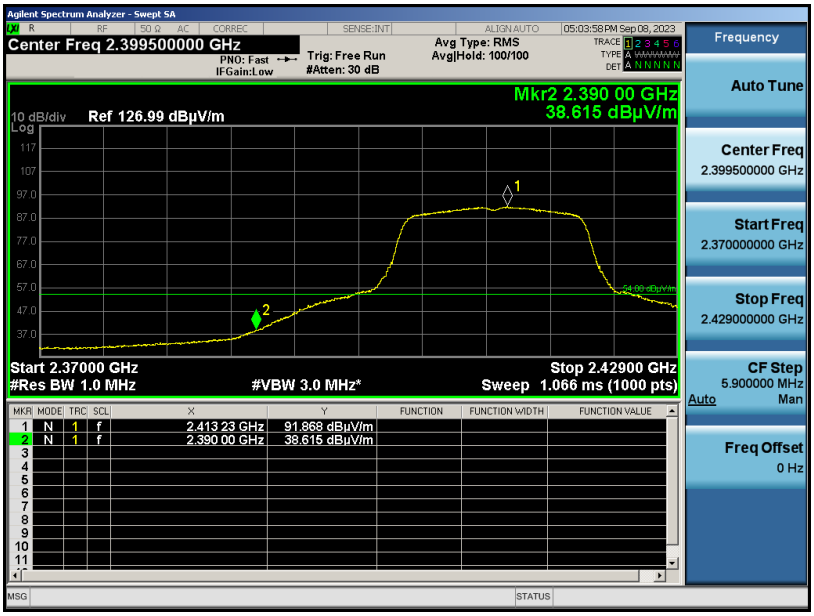
Band Edge Emission Test Results for Restricted Bands

EUT Name	Smart Space Heater	Model Name	NB-HE002
Temperature	22.5°C	Relative Humidity	57.6%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 4	Antenna Polarity	Vertical

Test Graph for Peak Measurement



Test Graph for Average Measurement

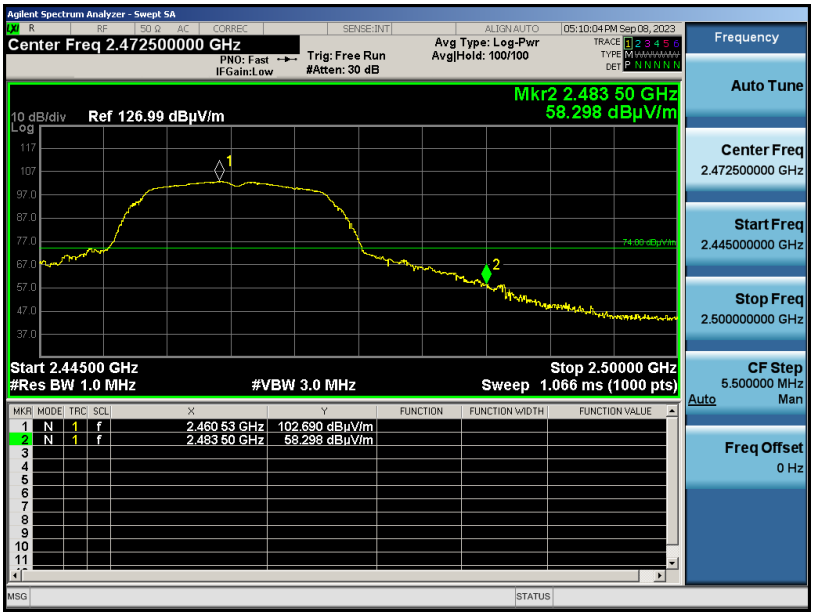


RESULT: Pass

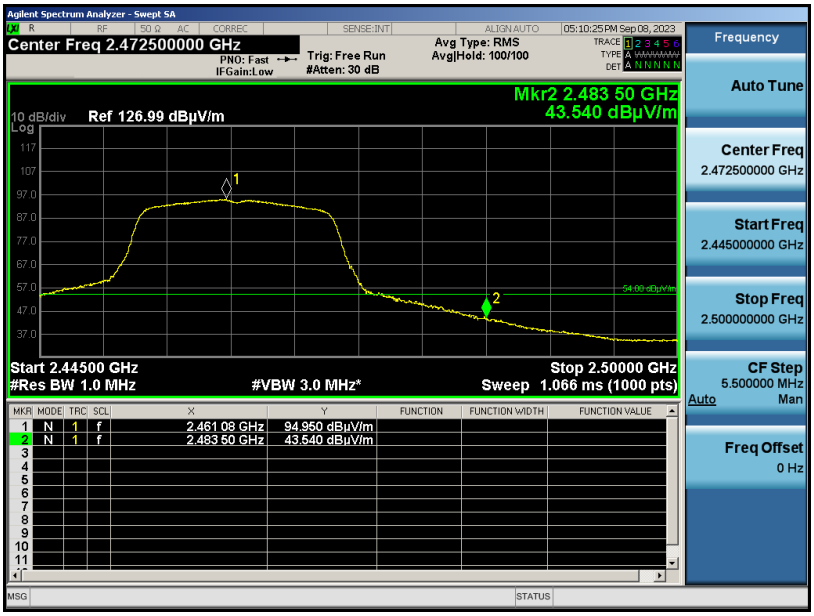
Band Edge Emission Test Results for Restricted Bands

EUT Name	Smart Space Heater	Model Name	NB-HE002
Temperature	22.5°C	Relative Humidity	57.6%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 6	Antenna Polarity	Horizontal

Test Graph for Peak Measurement



Test Graph for Average Measurement

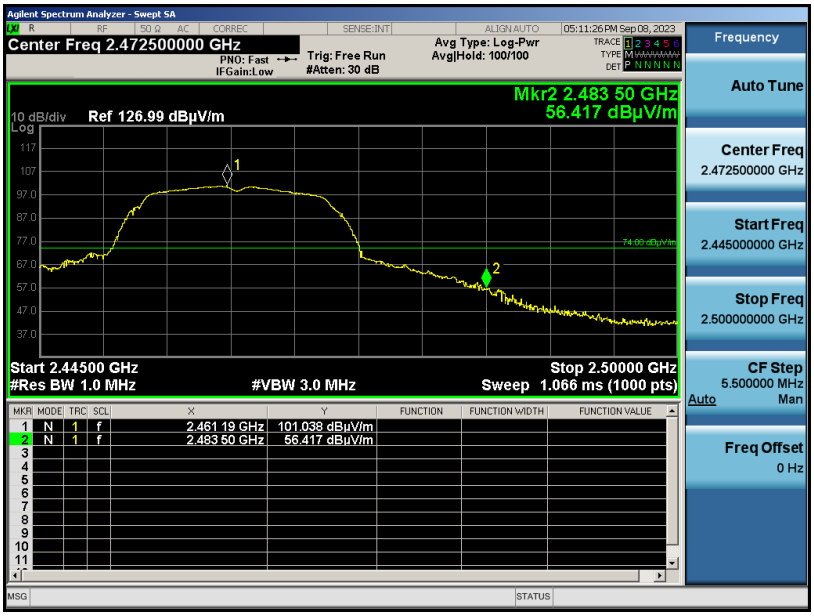


RESULT: Pass

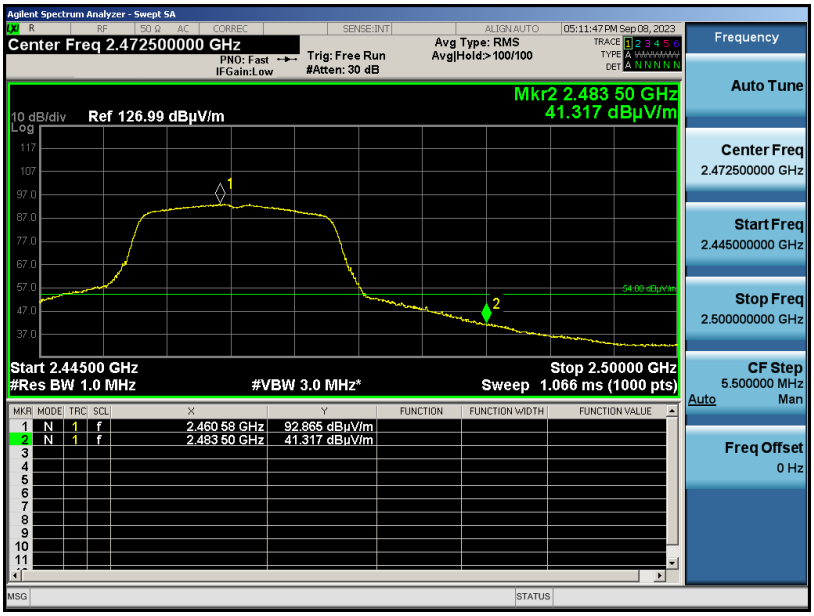
Band Edge Emission Test Results for Restricted Bands

EUT Name	Smart Space Heater	Model Name	NB-HE002
Temperature	22.5°C	Relative Humidity	57.6%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 6	Antenna Polarity	Vertical

Test Graph for Peak Measurement



Test Graph for Average Measurement

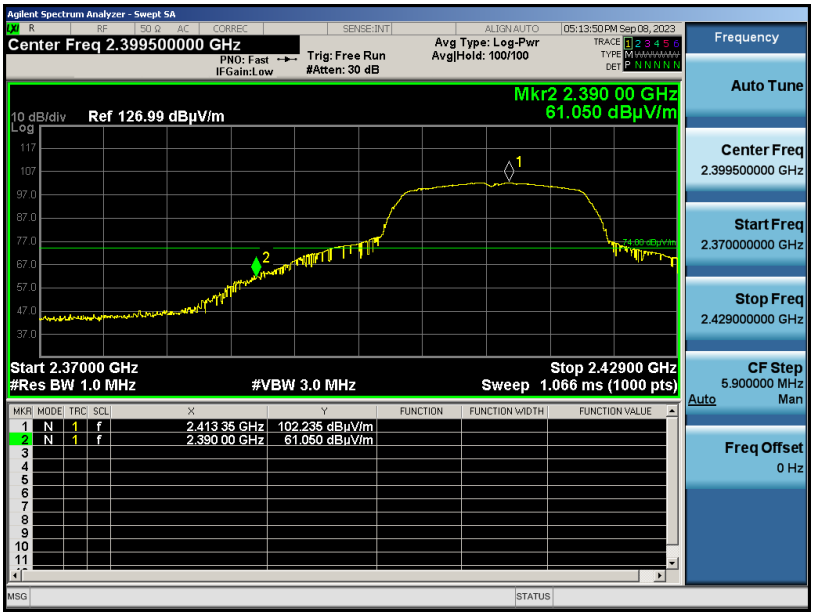


RESULT: Pass

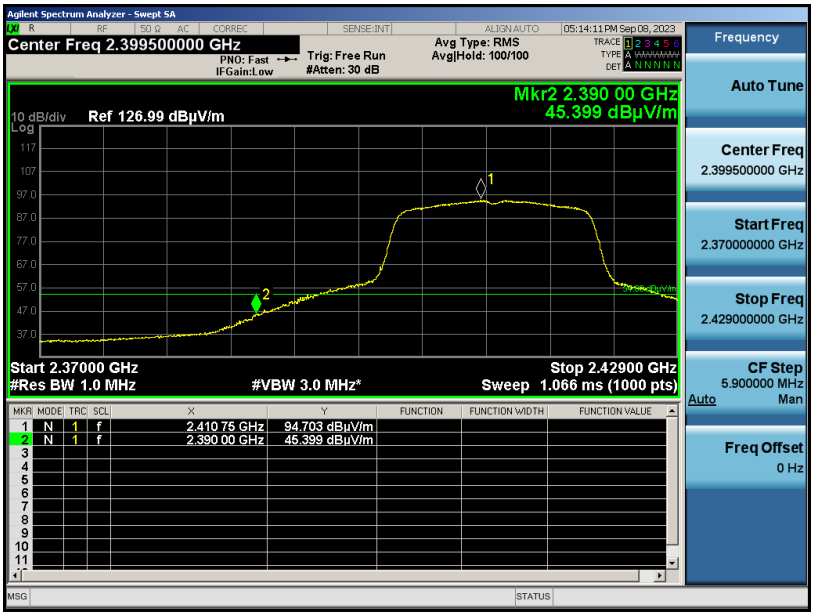
Band Edge Emission Test Results for Restricted Bands

EUT Name	Smart Space Heater	Model Name	NB-HE002
Temperature	22.5°C	Relative Humidity	57.6%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 7	Antenna Polarity	Horizontal

Test Graph for Peak Measurement



Test Graph for Average Measurement

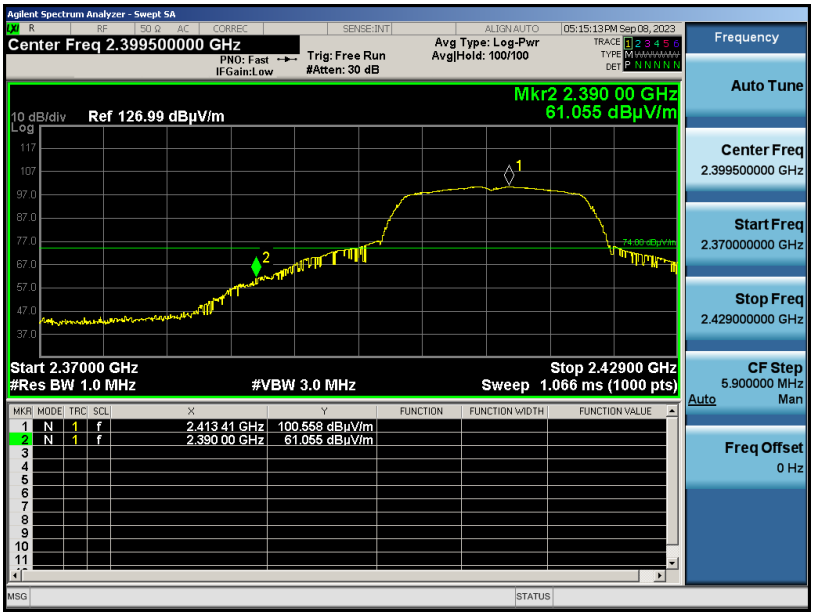


RESULT: Pass

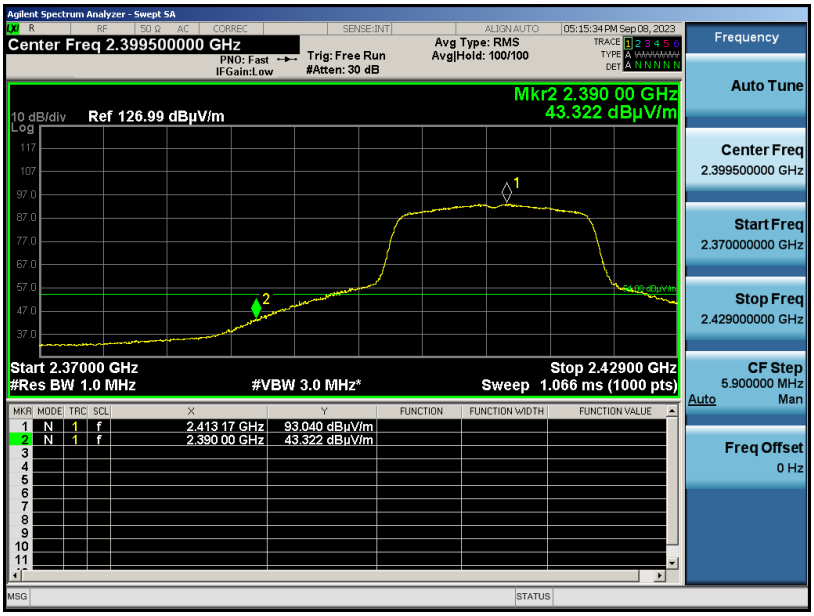
Band Edge Emission Test Results for Restricted Bands

EUT Name	Smart Space Heater	Model Name	NB-HE002
Temperature	22.5°C	Relative Humidity	57.6%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 7	Antenna Polarity	Vertical

Test Graph for Peak Measurement



Test Graph for Average Measurement



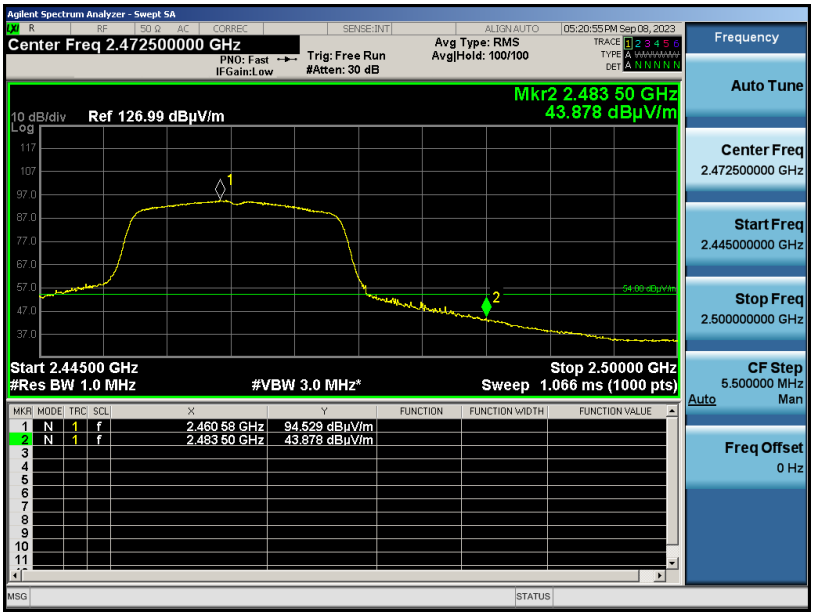
RESULT: Pass

Band Edge Emission Test Results for Restricted Bands

EUT Name	Smart Space Heater	Model Name	NB-HE002
Temperature	22.5°C	Relative Humidity	57.6%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 9	Antenna Polarity	Horizontal

Test Graph for Peak Measurement

Test Graph for Average Measurement



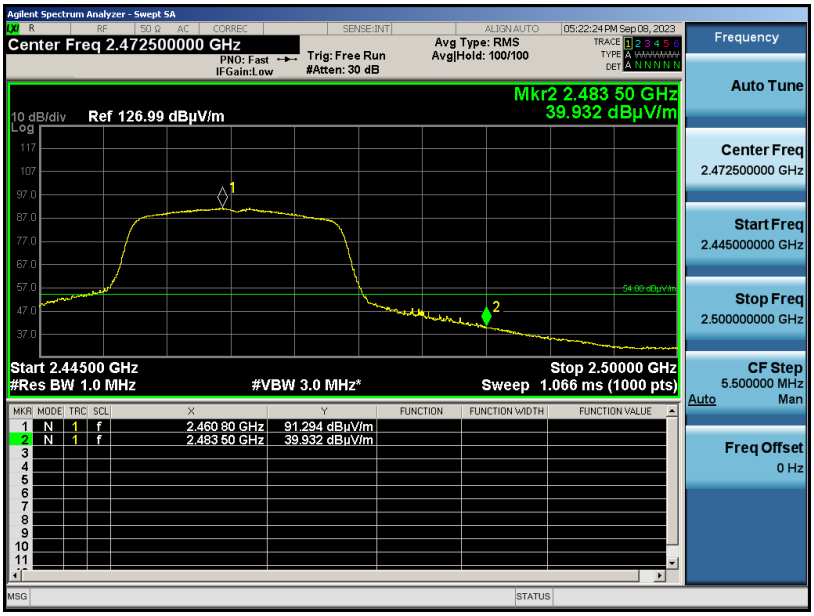
RESULT: Pass

Band Edge Emission Test Results for Restricted Bands

EUT Name	Smart Space Heater	Model Name	NB-HE002
Temperature	22.5°C	Relative Humidity	57.6%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 9	Antenna Polarity	Vertical

Test Graph for Peak Measurement

Test Graph for Average Measurement



RESULT: Pass

Note: The factor had been edited in the “Input Correction” of the Spectrum Analyzer.

12. AC Power Line Conducted Emission

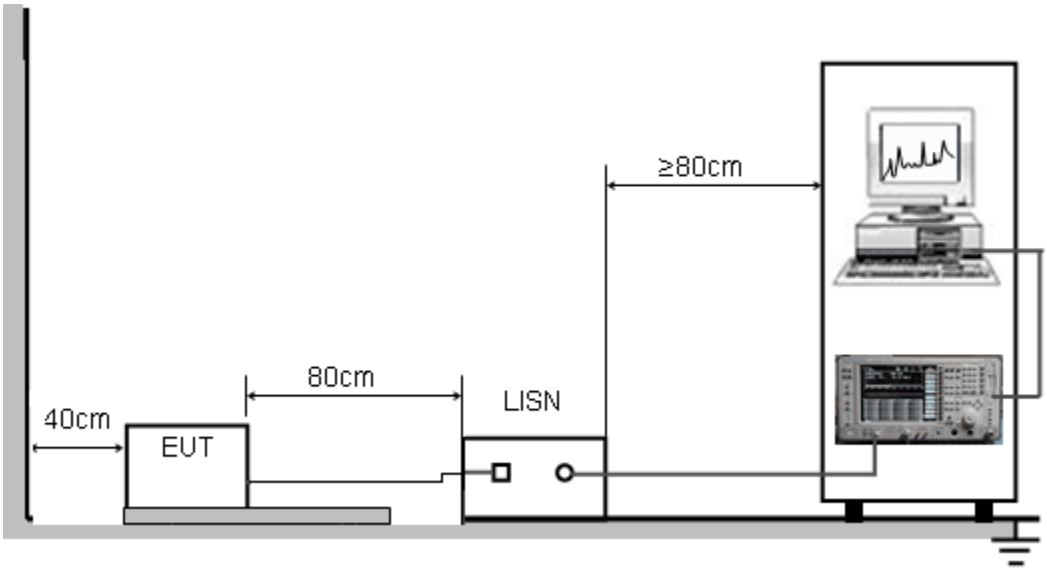
12.1 Measurement Limits

Frequency	Maximum RF Line Voltage	
	Q.P (dBμV)	Average (dBμV)
150kHz~500kHz	66-56	56-46
500kHz~5MHz	56	46
5MHz~30MHz	60	50

Note:

1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

12.2 Block Diagram of Line Conducted Emission Test



12.3 Preliminary Procedure of Line Conducted Emission Test

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 10cm non-conductive covering to insulate the EUT from the ground plane.
2. Support equipment, if needed, was placed as per ANSI C63.10.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4. All support equipment received AC120V/60Hz power from a LISN, if any.
5. The EUT received DC 5V power from adapter which received AC120V/60Hz power from a LISN.
6. The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 Ohm load; the second scan had Line 1 connected to a 50 Ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.
9. The test mode(s) were scanned during the preliminary test.

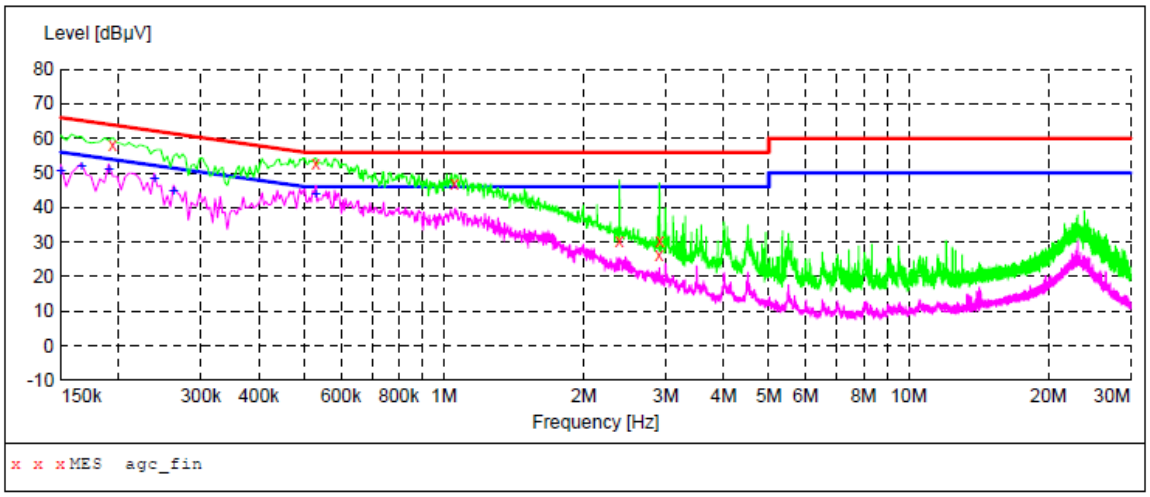
Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

12.4 Final Procedure of Line Conducted Emission Test

1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
2. A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less –2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
3. The test data of the worst case was reported on the Summary Data page.

12.5 Test Result of Line Conducted Emission Test

AC Power Line Conducted Emission Test			
Test Mode	Mode 1	LISN line	Hot Side



MEASUREMENT RESULT: "agc_fin"

2023/8/18 11:04

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.194000	58.20	6.1	64	5.7	QP	L1
0.530000	52.70	6.2	56	3.3	QP	L1
1.054000	46.70	6.2	56	9.3	QP	L1
2.386000	30.50	6.3	56	25.5	QP	L1
2.906000	26.10	6.3	56	29.9	QP	L1
2.914000	30.30	6.3	56	25.7	QP	L1

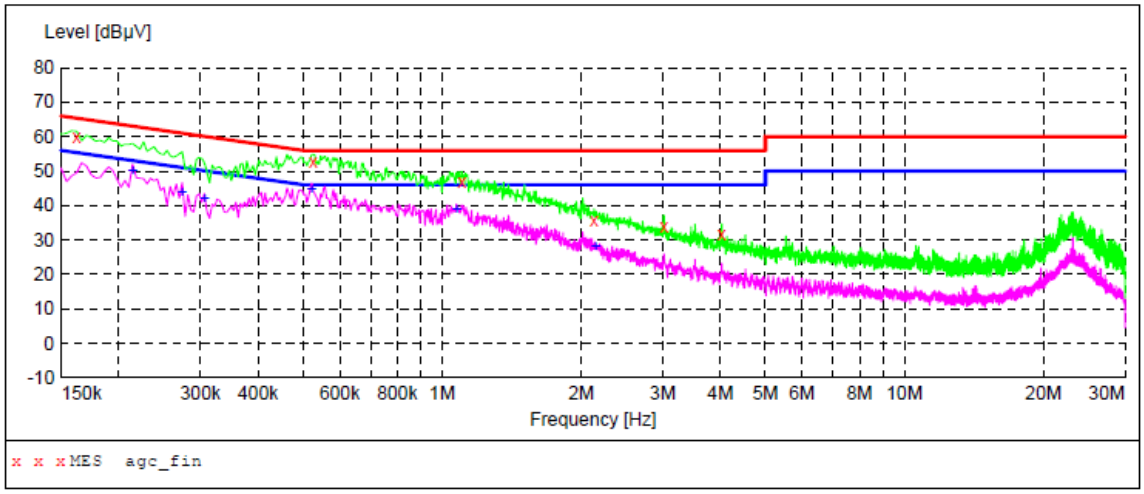
MEASUREMENT RESULT: "agc_fin2"

2023/8/18 11:04

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.150000	50.60	6.1	56	5.4	AV	L1
0.166000	51.90	6.1	55	3.3	AV	L1
0.190000	50.80	6.1	54	3.2	AV	L1
0.238000	48.20	6.1	52	4.0	AV	L1
0.262000	44.80	6.1	51	6.6	AV	L1
0.530000	43.90	6.2	46	2.1	AV	L1

RESULT: Pass

AC Power Line Conducted Emission Test			
Test Mode	Mode 1	LISN line	Neutral Side



MEASUREMENT RESULT: "agc_fin"

2023/8/18 11:01

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.162000	60.00	6.1	65	5.4	QP	N
0.526000	52.90	6.2	56	3.1	QP	N
1.102000	47.10	6.2	56	8.9	QP	N
2.130000	35.70	6.2	56	20.3	QP	N
3.018000	34.10	6.3	56	21.9	QP	N
4.026000	31.70	6.3	56	24.3	QP	N

MEASUREMENT RESULT: "agc_fin2"

2023/8/18 11:01

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.214000	49.90	6.1	53	3.1	AV	N
0.274000	43.60	6.1	51	7.4	AV	N
0.306000	42.00	6.1	50	8.1	AV	N
0.522000	44.60	6.2	46	1.4	AV	N
1.074000	39.00	6.2	46	7.0	AV	N
2.142000	28.10	6.2	46	17.9	AV	N

RESULT: Pass

Appendix I: Photographs of Test Setup

Refer to the Report No.: AGC15942230802AP01

Appendix II: Photographs of EUT

Refer to the Report No.: AGC15942230802AP02

----End of Report----

Conditions of Issuance of Test Reports

1. All samples and goods are accepted by the Attestation of Global Compliance (Shenzhen) Co., Ltd (the "Company") solely for testing and reporting in accordance with the following terms and conditions. The company provides its services on the basis that such terms and conditions constitute express agreement between the company and any person, firm or company requesting its services (the "Clients").

2. Any report issued by Company as a result of this application for testing services (the "Report") shall be issued in confidence to the Clients and the Report will be strictly treated as such by the Company. It may not be reproduced either in its entirety or in part and it may not be used for advertising or other unauthorized purposes without the written consent of the Company. The Clients to whom the Report is issued may, however, show or send it, or a certified copy thereof prepared by the Company to its customer, supplier or other persons directly concerned. The Company will not, without the consent of the Clients, enter into any discussion or correspondence with any third party concerning the contents of the Report, unless required by the relevant governmental authorities, laws or court orders.

3.The Company shall not be called or be liable to be called to give evidence or testimony on the Report in a court of law without its prior written consent, unless required by the relevant governmental authorities, laws or court orders.

4. In the event of the improper use of the report as determined by the Company, the Company reserves the right to withdraw it, and to adopt any other additional remedies which may be appropriate.

5. Samples submitted for testing are accepted on the understanding that the Report issued cannot form the basis of, or be the instrument for, any legal action against the Company.

6. The Company will not be liable for or accept responsibility for any loss or damage however arising from the use of information contained in any of its Reports or in any communication whatsoever about its said tests or investigations.

7.Clients wishing to use the Report in court proceedings or arbitration shall inform the Company to that effect prior to submitting the sample for testing.

8. The Company is not responsible for recalling the electronic version of the original report when any revision is made to them. The Client assumes the responsibility to providing the revised version to any interested party who uses them.

9. Subject to the variable length of retention time for test data and report stored hereinto as otherwise specifically required by individual accreditation authorities, the Company will only keep the supporting test data and information of the test report for a period of six years. The data and information will be disposed of after the aforementioned retention period has elapsed. Under no circumstances shall we provide any data and information which has been disposed of after retention period. Under no circumstances shall we be liable for damage of any kind, including (but not limited to) compensatory damages, lost profits, lost data, or any form of special, incidental, indirect, consequential or punitive damages of any kind, whether based on breach of contract of warranty, tort (including negligence), product liability or otherwise, even if we are informed in advance of the possibility of such damages.